

THE BIRDS OF COSTA RICA

DISTRIBUTION AND ECOLOGY

PAUL SLUD

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OF THE

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INTRODUCTION

A HALF CENTURY has elapsed since the publication of Carriker's annotated list of the birds of Costa Rica (1910). This was a pioneer report along modern lines for a Latin American country, certainly the first comprehensive one for Central America. Since 1910, new forms have been described, additional species recorded, and distributions expanded or subdivided in accordance with fluctuating taxonomic concepts.

Before the advent of Carriker most of the collecting was done in the region of the central highlands (fig. 1, inset). (For a résumé, see Carriker, 1910, pp. 357-365.) Carriker's collecting activities were virtually country-wide, although a large part of the work in the province of Guanacaste was carried on by Charles H. Lankester. Later, in the 1920's and early 1930's, Austin Paul Smith made extensive collections, many of which have not been reported, over most of the country. The last generation has been benefiting from Alexander Skutch's unparalleled contributions to the life histories of many species, particularly their nidification. My own work, occupying a period of seven full years between 1950 and 1962, has been national in scope and consists of two phases, the first devoted largely to synoptic collecting, the second to field observations.

Carriker listed 713 species represented by 746 forms belonging to 426 genera within the country's boundaries as presently established. These consisted of 322 nonpasserines, with 329 forms in 204 genera, and 391 passerines, with 417 forms in 222 genera. The present work eliminates 34 of the species, 10 by deletion and 24 through synonymization. According to the treatment here followed, Carriker's list would amount to 679 species in the republic of Costa Rica, excluding Cocos Island.

This report lists 758 species the occurrence of which I consider satisfactorily proved. These are represented by 864 forms belonging to 440 genera. Nonpasserines account for 366 species and 403 forms in 225 genera; passerines, 392 species and 461 forms in 215 genera.

The difference between Carriker's 679 species and the 758 in this work is made up

by the following. Species names given in brackets indicate sight records; all are discussed in the text.

Puffinus pacificus
Puffinus lherminieri
 [Pterodroma hasitata]
Pterodroma phaeopygia
Sula neboxii
 [Sula dactylatra]
Butorides striatus
Bubulcus ibis
Tigrisoma fasciatum
Ixobrychus exilis
Botaurus pinnatus
Mesembrinibis cayennensis
 [Plegadis falcinellus]
 [Anas platyrhynchos]
Anas americana
Aythya collaris
 [Cathartes burrovianus]
 [Elanus leucurus]
Ictinia mississippiensis
Ictinia plumbea
 [Harpyhaliaetus solitarius]
Falco peregrinus
Ortalis vetula
Rhynchortyx cinctus
Pardirallus maculatus
Amaurolimnas concolor
 [Laterallus ruber]
Charadrius alexandrinus
Charadrius wilsonia
 [Limosa fedoa]
 [Aphriza virgata]
Limnodromus scolopaceus
Calidris canutus
Crocethia alba
Erolia fuscicollis
 [Catharacta skua]
Stercorarius pomarinus
Larus atricilla
Gelochelidon nilotica
Sterna hirundo
 [Sterna anaethetus]
 [Sterna fuscata]
 [Sterna albifrons]
Scardafella inca
Touit dilectissima
Pionus menstruus
Crotophaga ani
Speotyto cunicularia
Asio flammeus
Caprimulgus rufus
Chaetura pelagica

Cypseloides cryptus
 [Panyptila cayennensis]
Damophila julie
Lepidopyga coeruleogularis
Chloroceryle inda
Notharchus tectus
Micromonacha lanceolata
Sphyrapicus varius
Xiphorhynchus flavigaster
Dysithamnus puncticeps
Chiroxiphia lanceolata
Tyrannus verticalis
Myiarchus cinerascens
Empidonax minimus
Iridoprocne bicolor
 [Vireo gilvus]
Vermivora pinus
Parula americana
Dendroica magnolia
Dendroica tigrina
Dendroica auduboni
Dendroica castanea
 [Cassidix nicaraguensis]
Icterus bullockii
Tangara inornata
Piranga ludoviciana
Habia atrimaxillaris
 [Sicalis luteola]

The following unrecorded species may be expected either occasionally or accidentally:

Podiceps caspicus
Procellariiformes (several)
Phaethon lepturus
Sula sula
Anas carolinensis
Anas cyanoptera
Gampsonyx swainsonii
Heterospizias meridionalis
Milvago chimachima
Falco femoralis
Rallus limicola
Porzana flaviventer
Laterallus exilis
Limosa haemastica
Micropalama himantopus
Erolia alpina
Phalaropus fulicarius
Steganopus tricolor
Stercorarius parasiticus
Stercorarius longicaudus
Larus delawarensis
Larus argentatus
Hydroprogne caspia
Thalasseus elegans
Thalasseus sandvicensis
Phaetusa simplex
Anous stolidus

Rynchops nigra
Patagioenas leucocephala
Asio stygius
Nyctibius grandis
Lurocalis semitorquatus
Nyctiphrynus ocellatus
Automolus rubiginosus
Myrmornis torquata
Tyrannus dominicensis
Atalotriccus pilaris
Progne subis
Phaeoprogne tapera
Petrochelidon fulva
Dendroica striata
Dendroica discolor
Dolichonyx oryzivorus
Melospiza lincolni

Most of the above-listed species have been found both north and south of Costa Rica. Among others that skip the country are:

Dendrocygna bicolor
Accipiter chionogaster
Pyrocephalus rubinus
Cyanocorax yncas
Mimus gilvus
Catharus dryas
Vireo altiloquus
Icterus chrysater

Species known as yet only from Costa Rica are:

Amazilia boucardi
Elvira cupreiceps
Selasphorus simoni
Habia atrimaxillaris
Chlorospingus zeledoni
Acanthidops bairdi

The following races, many of them poorly marked, seem to be confined to Costa Rica, though a few will probably be found in adjacent Nicaragua or Panama:

Crypturellus cinnamomeus praepes
Dendrortyx leucophrys hypospodius
Odonophorus leucolaemus smithianus
Pyrrhura hoffmanni hoffmanni
Aegolius ridgwayi ridgwayi
Amazilia cyanifrons alfaroana
Lampornis castaneiventris cinereicauda
Trogon melanocephalus illaetabilis
Trogon aurantiiventris underwoodi
Xiphocolaptes promeropirhynchus costaricensis
Dendrocolaptes certhia hesperius
Xiphorhynchus flavigaster ultimus
Synallaxis albescens latitabunda
Conopias parva distincta

Myiarchus ferox actiosus
Contopus cinereus rhizophorus
Cyanolyca argentigula albior
Thryorchilus browni ridgwayi
Thryorchilus browni basulto
Turdus albicollis oblitus
Catharus aurantirostris bathoica
Myioborus miniatus comptus
Basileuterus melanogenys melanogenys
Icterus pectoralis espinachi
Agelaius phoeniceus costaricensis
Habia rubica alfaroana
Chlorospingus canigularis olivaceiceps
Arremonops rufivirgata superciliosa
Melospiza biarcuatum cabanisi
Melospiza leucotis leucotis
Aimophila rufescens hypaethrus
Emberizoides herbicola lucaris

Regionally, Costa Rica is situated in the tropics. Biogeographically, the avifauna is predominantly neotropical. This is almost universally true of the resident land birds. The majority of the native species are of South American origin, but there is also a considerable element from northern Central America and Mexico.

Thus, with the analysis restricted to present-day breeding distributions on the mainland, 620 species (belonging to 353 genera) are neotropical. These include a relatively small number that range northward into warm-temperate North America and a still smaller number that reach cool-temperate North America. Of the 620 species, 164 are Middle American, though 91 of the 114 genera to which they belong are South American. Another 14 species (belonging to 13 genera) are primarily, though not exclusively, Middle American. Of the 13 genera, 10 are South American, one is Middle American, and two are essentially Middle American but also occur in northern Colombia.

The remaining 138 species are distributed as follows. Eight species (five genera) are pelagic. The other 130 species (belonging to 82 genera) are not neotropical. Regionally, however, 40 of the genera occur well into or throughout South America, another three are present but poorly represented in South America, and two others are, respectively, southern North American and northern Middle American. All but nine species are northern migrants or wanderers to Costa Rica. Five of the nine are represented there by both migrant and resident forms, another

includes residents and possibly migrants, while the remaining three species are resident from North America to southern Central America. Dominant among the migratory groups are the Charadriiformes, with 31 species, and the Parulidae, with 29 species.

Physiographically (pls. 1, 2), Costa Rica has a Caribbean slope and a Pacific slope which are separated from each other by mountains that run the length of the country while following its northwest-southeast orientation. The Guanacaste and Tilarán Cordilleras make up the continental divide in the northwest and join the Cordillera Central. The Cordillera Central consists mainly of four imposing volcanoes (Poás, Barba, Irazú, and Turrialba) which lie in a west-east direction and form the northern boundary of an intermontane valley known as the central plateau (meseta central). The southern edge of the central plateau is formed by other mountains that merge with the Talamanca Cordillera, which extends southeastward into western Panama.

Because of geography, climate, and geological history, the country has four principal avifaunal zones:

1. The northern half of the Pacific slope, from sea level to lower subtropical elevations, is subhumid to moist. This area, a continuation of the relatively arid Pacific slope of Mexico and northern Central America, terminates abruptly at the entrance to the Gulf of Nicoya and the southern border of the central plateau. It possesses an avifauna the elements of which are most conspicuous in the subhumid northwestern lowlands.

The following "Guanacaste" birds are typical of the Tropical Dry Forest Life Zone or Formation that covers most of the northwestern sector, though part of the avifauna rises in decreasing numbers to the largely deforested central plateau region, primarily or exclusively on its drier Pacific side. A few species also occur in the Río Frío region of the Caribbean side, just southeast of Lake Nicaragua. Migrants are marked with an asterisk.

Crypturellus cinnamomeus
Mycteria americana
Jabiru mycteria
Dendrocygna viduata
Dendrocygna autumnalis
Rostrhamus sociabilis

Buteo albicaudatus
Buteo albonotatus
Parabuteo unicinctus
Busarellus nigricollis
Polyborus plancus
 **Falco peregrinus*
Ortalis vetula
Colinus leucopogon
Laterallus ruber
Burhinus bistriatus
 **Zenaidura macroura*
Zenaida asiatica
Scardafella inca
Aratinga canicularis
Amazona albifrons
Amazona ochrocephala
Morococcyx erythropygus
Otus cooperi
 **Chordeiles acutipennis*
Anthracothonax prevostii
Amazilia saucerottii
Amazilia rutila
Trogon melanocephalus
Trogon elegans
Eumomota superciliosa
Centurus hoffmanni
Xiphorhynchus flavigaster
Chiroxiphia linearis
 **Muscivora forficata*
Myiarchus nultingi
Myiarchus tyrannulus
Platyrinchus cancrinus
Sublegatus arenarum
Camplostoma imberbe
Calocitta formosa
Campylorhynchus rufinucha
Thryothorus pleurostictus
Salpinctes obsoletus
Poliophtila albiloris
Vireo pallens
Icterus pectoralis
Icterus pustulatus
Agelaius phoeniceus
Tanagra affinis
 **Piranga ludoviciana*
Guiraca caerulea
Arremonops rufivirgata
Ammodramus savannarum
Aimophila ruficauda
Aimophila rufescens
Aimophila botteri

The avifaunal affinities of the above are preponderantly northern Central American and Mexican. "Rain"-forest groups are largely to entirely missing. Of the resident species, 35 are at their southern geographic limit. Another four species, which, after skip-

ping most of Costa Rica and all of Panama, also occur in South America, are in this sector at their southern limit in Central America. Two South American species are here at their northern limit.

2. The southern half of the Pacific slope, southward from approximately the entrance to the Gulf of Nicoya, has humid to very wet climatic conditions similar to those on the Caribbean side. Here the majority of the birds are represented by species that occur in the humid life zones on both slopes. Nevertheless this southwestern sector is made avifaunally distinct by reason of a number of species geographically thus virtually restricted and by the absence of many Caribbean kinds. The following list of these typically southwestern species reveals their origin as almost exclusively South American. Most are either at their northern geographic limit in or are confined to southwestern Costa Rica and adjacent humid-forested Panama. A few extend somewhat farther northwestward and to the region of the central plateau. Several are known only from or are most abundant in the "savannas" of the Térraba region in the Costa Rican portion of their range. A few of these last may also be present in similar habitat elsewhere in the southwest.

Odontophorus gujanensis
Patagioenas speciosa
Columbigallina minuta
Crotophaga ani
Dromococcyx phasianellus
Rhinopteryx clamator
Chaetura spinicauda
Damophila julie
Lepidopygia coeruleogularis
Amazilia edward
Elvira chionura
Trogon bairdii
Pteroglossus frantzii
Picumnus olivaceus
Centurus rubricapillus
Centurus chrysauken
Veniliornis kirkii
Dendrocincla anabatina
Deconychura longicauda
Thamnophilus bridgesi
Synallaxis albescent
Pipra coronata
Chiroxiphia lanceolata
Manacus aurantiacus
Cotinga ridgwayi
Carpodectes antoniae

Muscivora tyrannus
Myiobius atricaudus
Myiophobus fasciatus
Elaenia chiriquensis
Camptostoma obsoletum
Ornithion semiflavum
Thryothorus semibadius
Thryothorus fasciatoventris
Thryothorus rutilus
Hylophilus flavipes
Tanagra lanirostris
Tanagra imitans
Habia atrimaxillaris
Rhodinocichla rosea
Saltator albicollis
Sporophila schistacea
Sporophila aurita aurita
Sporophila nigricollis
Sporophila minula
Atlapetes torquatus
Emberizoides herbicola

Four of the above species have been found on the Caribbean slope: *Patagioenas speciosa* in the Río Frío region; *Veniliornis kirkii* and *Pipra coronata* in the Sixaola area; *Deonychura longicauda*, locally and in small numbers, primarily in the upper tropical and lower subtropical belts on the approaches to the central highlands.

The following birds occur the length of the Pacific slope, though only 10 species are definitely thus restricted. All the others, including a number that also inhabit the central highlands, are, however, rare on the Caribbean side, where five of the species are known only from the Río Frío region. Migrants and wanderers are marked with an asterisk. Probably most of the migrants, several of which have been recorded only once or twice, visit the Caribbean side, too, though have not yet been found there.

**Puffinus pacificus*
 **Pterodroma phaeopygia*
 **Phaethon aethereus*
Sula neboixii
Tigrisoma mexicanum
Eudocimus albus
 **Plegadis chihi* (status ?)
Ajaia ajaja
Cairina moschata
Buteo brachyurus
Buteo nitidus
Harpyhaliaetus solitarius
 **Circus cyaneus*
Geranospiza nigra

**Haematopus palliatus*
 **Charadrius alexandrinus*
 **Limosa fedoa*
 **Totanus melanoleucus*
 **Aphriza virgata*
 **Limnodromus griseus*
 **Calidris canutus*
 **Ereunetes mauri*
 **Erolia fuscicollis*
 **Erolia bairdii*
 **Stercorarius pomarinus*
 **Larus pipixcan*
 **Chlidonias niger*
 **Gelochelidon nilotica*
 **Sterna hirundo*
 **Sterna albifrons*
Leptotila plumbeiceps
Ara macao
Brotogeris jugularis
Coccyzus minor
Tapera naevia
 **Caprimulgus vociferus*
Phaeochroa cuvierii
Amazilia boucardi
Heliomaster constantii
 **Archilochus colubris*
Momotus momota
Myiodynastes maculatus
Myiarchus ferox
Empidonax albigularis
Thryothorus rufalbus
 **Bombycilla cedrorum*
 **Protonotaria citrea*
Habia rubica
Eucometis penicillata
 **Passerina ciris*

3. The following is a list of the species which, so far as known, are exclusively or primarily Caribbean. Migrants and wanderers, many of which will probably be found on the Pacific slope, too, are marked with an asterisk. As with all the listings, the reader is advised to consult the text for specific details.

Crypturellus boucardi
 **Pterodroma hasitata*
Tigrisoma lineatum
Tigrisoma fasciatum
Botaurus pinnatus
Mesembrinibis cayennensis
 **Plegadis falcinellus*
 **Anas platyrhynchos*
 **Aythya collaris*
Elanus leucurus (status ?)
Ictinia plumbea
Leucopternis semiplumbea
Micrastur mirandollei

Falco deiroleucus
 **Falco columbarius*
Odontophorus erythrops
Rhynchortyx cinctus
Pardirallus maculatus
Amaurolimnas concolor
 **Catharacta skua*
 **Sterna anaethetus*
 **Sterna fuscata*
Geotrygon veraguensis
Ara ambigua
Aratinga finschi
Aratinga astec
Touit dilectissima
Pionus menstruus
Neomorphus geoffroyi
Otus vermiculatus
Otus choliba
Glaucidium minutissimum
Caprimulgus rufus
 **Chaetura pelagica*
Chaetura cinereiventris
Doryfera ludovicae
Lophornis helenae
Popelairia conversii
Amazilia cyanura
Eupherusa nigriventris
Elvira cupreiceps
Microchera albocoronata
Chalybura urochrysa
Trogon clathratus
Chloroceryle inda
Electron platyrhynchum
Electron carinatum
Baryphthengus ruficapillus
Jacamerops aurea
Notharchus tectus
Micromonacha lanceolata
Monasa morphoeus
Pteroglossus torquatus
Selenidera spectabilis
Ramphastos sulfuratus
Celeus castaneus
Celeus loricatus
Centurus pucherani
Dendrocincla fuliginosa
Xiphocolaptes promeropirhynchus
Sclerurus albigularis
Cymbilaimus lineatus
Thamnophilus punctatus
Dysithamnus striaticeps
Dysithamnus puncticeps
Myrmotherula fulviventris
Myrmotherula axillaris
Myrmeciza laemosticta
Formicarius nigricapillus
Formicarius rufipectus
Hylophylax naeviioides

Phaenostictus mcleannani
Pittasoma michleri
Grallaria guatemalensis
Grallaria fulviventris
Piprites griseiceps
Pipra pipra
Manacus candei
Cotinga amabilis
Carpodectes nitidus
Querula purpurata
Cephalopterus glabricollis
Colonia colonus
 **Tyrannus verticalis*
Conopias parva
 **Myiarchus cinerascens*
Aphanotriccus capitalis
Tolmomyias assimilis
Todirostrum nigriceps
Myiornis atricapillus
Phylloscartes supercilii
Ornithion brunneicapillum
 **Iridoprocne bicolor*
Psilorhinus morio
Cyanocorax affinis
Cyanolyca cucullata
Campylorhynchus zonatus
Thryothorus thoracicus
Thryothorus nigricapillus
Thryothorus atrogularis
Cyphorhinus phaeocephalus
 **Dumetella carolinensis*
Turdus fumigatus
 **Hylocichla fuscescens*
Catharus mexicanus
Microbatas cinereiventris
 **Vireo gilvus*
 **Vermivora pinus*
 **Parula americana*
 **Dendroica auduboni*
 **Dendroica cerulea*
 **Dendroica castanea*
Geothlypis semiflava
 **Wilsonia citrina*
Gymnostinops montezuma
Scaphidura oryzivora
Cassidix nicaraguensis
Icterus prothemelas
Icterus mesomelas
Tanagra anneae
Tanagra gouldi
Tangara florida
Tangara inornata
Tangara lavinia
Buthraupis arcaei
Phlogothraupis sanguinolenta
Chlorothraupis carmioli
Habia fuscicauda
Tachyphonus rufus

Tachyphonus delatirii
Heterospingus rubrifrons
Mitrospingus cassinii
Chrysomitris chrysomelas
Chlorospingus canigularis
Saltator atriceps
Caryothraustes poliogaster
Pitylus grossus
Sporophila aurita corvina
Lysurus crassirostris

Of the native species, exclusive of southern Central American endemics, 33 are at their known northern geographic limit, though several lowland inhabitants probably extend farther northward. Seven species are at their southern limit, but several of these almost surely reach adjacent Panama.

To generalize, the affinities of the above Caribbean species are largely South American; those of the considerable number of species (not listed) that occur both on the Caribbean slope and in the Pacific southwest are almost entirely South American.

4. The Costa Rica-Chiriquí highlands make up the fourth avifaunal zone. The species thus sharply restricted in range are:

Chamaepetes unicolor
Odontophorus leucolaemus
Geotrygon costaricensis
Geotrygon chiriquensis
Pyrrhura hoffmanni
Otus clarkii
Caprimulgus saturatus
Pantherpe insignis
Eupherusa nigriventris
Elvira chionura
Lampornis hemileucus
Lampornis castaneiventris
Philodice bryantae
Selasphorus flammula
Selasphorus scintilla
Trogon aurantiiventris
Semnornis frantzii
Margarornis rubiginosus
Thripadectes rufobrunneus
Scytalopus argentifrons
Cephalopterus glabricollis
Myiodynastes hemichrysus
Contopus lugubris
Contopus ochraceus
Empidonax atriceps
Cyanolyca argentigula
Troglodytes ochraceus
Thryorchilus browni
Turdus nigrescens

Catharus gracilirostris
Zeledonia coronata
Ptilogonys caudatus
Phainoptila melanozantha
Vireo carmioli
Diglossa plumbea
Vermivora gutturalis
Myioborus torquatus
Tangara dowii
Buthraupis arcae
Chlorospingus pileatus
Pezopetes capitalis
Pselliophorus tibialis
Lysurus crassirostris
Junco vulcani

The affinities of the above are in the main neotropical, with the lines of close relationship pointing to South America in the majority of cases.

A goodly number of additional species are represented by the following races known only from the Costa Rica-Chiriquí highlands. Here 14 of the species are at their southern geographic limit. Most of the others, 37 of which are at their northern limit, have a predominantly South American distribution.

Nothocercus bonapartei frantzii
Buteo jamaicensis costaricensis
Leucopternis princeps princeps
Columba fasciata crissalis
Oenonotus subvinacea subvinacea
Geotrygon lawrencii lawrencii
Touit dilectissima costaricensis
Glaucidium jardinii costaricanum
Doryfera ludovicae veraguensis
Eutoxeres aquila salvini (also in lowlands)
Campylopterus hemileucurus mellitus
Colibri thalassinus cabanidis
Eupherusa eximia egregia
Heliodoxa jacula henryi
Eugenes fulgens spectabilis
Pharomachrus mocinno costaricensis
Eubucco bourcierii salvini
Aulacorhynchus prasinus maxillaris
Piculus rubiginosus uropygialis
Melanerpes formicivorus striatipictus
Dendrocopos villosus extimus
Dendrocolaptes picumnus costaricensis
Lepidocolaptes affinis neglectus
Campylorhamphus pusillus borealis
Cranioleuca erythrops rufigenis
Premnoplex brunnescens brunneicauda
Pseudocolaptes lawrencii lawrencii
Syndactyla subalaris lineata
Philydor rufus panerythrus (also localized in Colombian Andes)

Xenops rutilans septentrionalis
Sclerurus albigularis canigularis
Sclerurus mexicanus pullus
Myrmeciza laeosticta laeosticta
Myrmeciza immaculata zeledoni
Formicarius nigricapillus nigricapillus
Pittasoma michleri zeledoni
Grallaricula flavirostris costaricensis
Pipra pipra anthracina
Pachyramphus versicolor costaricensis
Sayornis nigricans amnicola
Empidonax flavescens flavescens
Mitrephanes phaeocercus aurantiiventris
Phylloscartes superciliaris superciliaris
Serpophaga cinerea grisea
Elaenia frantzii frantzii
Acrochordopus zeledoni zeledoni
Leptopogon superciliaris hellmayri
Mionectes olivaceus olivaceus
Oxyruncus cristatus frater
Cyanolyca cucullata cucullata
Cinclus mexicanus ardesiacus
Cistothorus platensis lucidus
Henicorhina leucophrys collina
Turdus plebejus plebejus
Myadestes ralioides melanops
Catharus fuscater hellmayri
Catharus frantzii frantzii
Vireo leucophrys chiriquensis
Myioborus miniatus aurantiacus
Basileuterus tristriatus melanotis
Basileuterus melanogenys melanogenys
Chlorophonia occipitalis callophrys
Tanagra anae anae
Tangara florida florida
Tangara icterocephala frantzii
Tangara gyrola bangsi
Piranga leucoptera latifasciata
Piranga bidentata citrea
Chrysothlypis chrysomelas chrysomelas
Pheucticus chrysopheplus tibialis
Spodiornis rusticus barrilesensis
Atlapetes gutturalis brunnescens
Atlapetes brunneinucha elsae
Zonotrichia capensis costaricensis

Other Costa Rica-Chiriquí species of the highlands that occur elsewhere to the north or the south or both, but are not represented by a local race, are the following. Migrants are marked with an asterisk.

Odontophorus guttatus
Zenaidura macroura
Bolborhynchus lineola
Lampornis calolaema
Trogon collaris
**Sphyrapicus varius*
Anabacerthia striaticollis

Procnias tricarunculata
Pygochelidon cyanoleuca
**Dendroica virens*
**Dendroica fusca*
**Oporornis tolmiei*
**Wilsonia pusilla*
Tanagra elegantissima
Tangara chrysophrys
Spinus xanthogaster

Of the above, three native species are at their southern limit, three are at their northern limit, two are southern Central American, and three of the migrants, so far as known, are at the southern limit of their wintering ranges.

A number of species are known in Costa Rica only or primarily from the central highlands, including the northwestern divide or not. Probably the larger proportion, particularly those that also occur in western Panama, will eventually be found on the Talamanca Cordillera. These last were necessarily also listed above. Known migrants, all of them rare, are marked with an asterisk.

**Bataureus lentiginosus*
**Ictinia mississippiensis*
**Accipiter cooperii*
Dendrotyx leucophrys
**Tryngites subruficollis*
**Lobipes lobatus*
Zenaidura macroura
Claravis mondetoura
Otus clarkii
Bubo virginianus
Glaucidium jardinii
**Speotyto cunicularia*
**Asio flammeus*
Aegolius ridgwayi
Caprimulgus saturatus
Cypseloides cherriei
Cypseloides cryptus
Cypseloides niger
Colibri thalassinus
Lophornis delattrei
Lampornis hemileucus
Lampornis calolaema
Philodice bryantae
Selasphorus simoni
Trogon aurantiiventris
Philydor rufus
Pachyramphus versicolor
Myiodynastes hemichrysus
Contopus ochraceus
Acrochordopus zeledoni
Cistothorus platensis
Basileuterus tristriatus

Tangara dowii
Chlorospingus zeledoni
Pheucticus chrysopheplus
Spodiornis rusticus
Acanthidops bairdi
Melospiza biarcuatum
Melospiza leucotis

In addition, the only specimen of *Amazilia*

cyanifrons known outside South America was collected somewhere on Miravalles Volcano in the Guanacaste Cordillera.

All the rest of the avifauna, amounting to 44 per cent of the species, occurs on both the Caribbean and Pacific slopes, though seldom in equal abundance and largely exclusive of the subhumid northwest.

THE LIFE-ZONE MAP

The following brief explanation of the plant-formation or life-zone map (fig. 1) and description of the native vegetation of Costa Rica I have abstracted and paraphrased or quoted verbatim, with occasional modifications, from Holdridge (1953a, 1953b, 1956, 1957, 1962) and Tosi (1960).

The Holdridge system permits the identification and mapping of the relation between climate and the major vegetation divisions of the world by dividing the climate into latitudinal temperature regions and subdividing each region into altitudinal temperature belts. Each belt is then broken down into plant formations on the basis of annual precipitation.

A formation, or life zone, is, therefore, one of a number of uniformly weighted divisions of the climate of the earth, each of which supports a distinct set of plant associations.

An association is a dominant community of plants which, in its mature natural state, has a physiognomy distinct from that of all other plant associations. An association may be characterized locally or regionally by certain indicator species of the community. But globally it should be named after its edaphic or other special conditions, to facilitate comparison elsewhere in the world by another ecologist. There are four types of plant associations: climatic, edaphic, atmospheric, and hydric. The associations are not shown on the map, because its scale is too small and too few associations have been delimited or described.

A climatic association is a plant community growing on a zonal soil in a zonal climate. There is only one climatic association in each life zone. An edaphic association is a plant community growing on an azonal or an intrazonal soil. An atmospheric association is a plant community growing in an azonal cli-

mate, examples of which are a Mediterranean climate, a monsoon climate, a cloud-forest climate, and coastal or mountain-ridge climates with strong winds. A hydric association is a plant community growing on soil covered by water during all or most of the year.

Several kinds of edaphic, atmospheric, or hydric associations may be present in each formation. Further, various combinations of these three types are possible. For example, a beach thicket growing on nearly pure sand and subjected to strong coastal winds would comprise an edapho-atmospheric association.

A fundamental error is the one of assigning the edaphic or other special associations a value equivalent to that of the formation. The physiognomy of a gallery forest in the plains of the cold-temperate region is quite distinct from that of a gallery forest in an arid section of the tropical region. Even in the same region of the tropics, the special edaphic conditions suitable for mangroves give rise to distinctly different physiognomies in the humid and dry sections. The physiognomy of the natural vegetation, quite apart from its floristics, is the counterbalancing result of an underlying cause: the availability of moisture. Different physiognomies have been evolved as a response to local variations in the factors that cause an appreciable change in evaporation, in transpiration, or in both.

Between the dry formations, of which there is only one in Costa Rica, and the humid formations runs a line of unity along which potential evapotranspiration is equal to precipitation (Holdridge, 1962, pp. 3-4). Moving toward the drier districts, one would expect the proportion of evaporation to increase relative to transpiration. But, apparently, transpiration keeps pace with evaporation through an increase in the percentage of species which, by means of more extensive

root systems or water-storage tissues, can continue to transpire throughout the temperature growing season. In the opposite direction toward more humid conditions, the equality is apparently maintained by the development of greater leaf areas, more complex vegetation, and increasing epiphytism. The number of arboreal strata appears to be a related regulatory factor.

In the tropics the correlation between the amount of annual rainfall and the dry periods is strongly marked. There are those who believe that the distribution of the rainfall should have a very important influence on the vegetation. Actually, in zones with little rainfall, the growing season is very short and the period of drought very long. In the same way, the effective dry period is very short or nonexistent in zones with high rainfall. Only in the intermediate zones can there be significant differences in the distribution of the rains, but the differences in physiognomy are small and can be better indicated in the subordinate divisions of the formations. Monsoon rain forests provide an apparent exception, but they belong to special atmospheric associations and are not restricted to a particular life zone.

Where formations are extensive, the vegetation type is clearly seen, but in many cases the transition lines are not. When three or more formations are juxtaposed, the transition should be almost continuous and the mixture of vegetation very confused. Especially in the tropical mountains, the formations often cover less territory than does an association in temperate regions. Two neighboring sites may be situated in very distinct climates, thus indicating not only that they belong to distinct formations but that they are also separated by an intervening formation in which the climate is changing so rapidly that there are no well-defined associations. Some ecologists have called such transition areas a "continuum," but the word "transition" adequately covers these situations. If he begins with the larger divisions, that is, the formations or life zones, it becomes much easier for the investigator to apprehend the relative values among the smaller divisions, that is, the associations and subassociations.

A close relation between the climatic conditions and the number of species in an associa-

tion is clearly indicated by the few studies of this kind in the tropics. In the tropical mountains, the number of arboreal species, as well as the over-all average leaf size per association, generally doubles with each descent from one belt to the next, if one follows the same humidity province and works on climatic soils. Once the number of species that should be present is known, a reduction in number indicates special edaphic or other conditions.

If two vegetations, whether in the same or different biogeographical regions, are physiognomically different, one can determine the factor or factors causing the difference, including the action of man. For example, high concentrations of salts in the soil, limestone, or sand result in a vegetation more xeric in character, while a high water table produces a more mesic vegetation. Cloud-forest conditions constitute an atmospheric factor not confined to a particular formation but capable of affecting the associations in various formations. The climatic associations should be studied first, as they are the "yardstick" against which to make comparisons among all associations.

It is important to restrict oneself to arboreal species as climatic and edaphic indicators in the tropics. First, the flora is so immense that it is almost impossible to work with all the species. Knowing just the trees taxonomically is a sufficiently difficult task. Second, the other kinds of plants are not exposed to the effects of climate as are the trees. In any forest, special conditions, not typical of the climate in general, exist under which smaller plants find favorable microclimates. Hence the inclusion of these minor categories weakens the distinctions between the associations. Naturally, formations that lack trees should be worked with such dominant plants as are exposed to the greater effects of the climate.

Although temperature and precipitation determine the plant formations, the geological history of an area is largely responsible for the specific composition. Costa Rica, as part of the isthmus connecting North and South America, has at present a considerable intermingling of the floras of both continents. The division between the dominance of one or the other occurs at the low break in south-

ern Nicaragua and northern Costa Rica, which, according to Schuchert (1935), was covered by open sea in the Oligocene and in the Lower and Middle Miocene. Because the physiognomy of the vegetation depends also on edaphic factors, geology again becomes important when the parent material produces azonal soils that support very characteristic associations.

No description can be complete without a consideration of the effects of man. These vary from the obvious substitution of a man-tended association, such as a cornfield or a coffee plantation, for the original forest to the scarcely detectable result of past removal of an occasional valuable timber tree. Though one is impressed primarily by the more recent changes, considerable areas thought to be completely natural owe some of their characteristics to human influence as far back as prehistoric times. These characteristics are believed to be a result of clearing for cultivation or the use of fire.

Since the arrival of the European, the impact of man has been accelerating. Introduced weed plants have become thoroughly integrated with the natural flora, especially in cleared areas. Even escaped ornamentals and crop plants are often considered natural by the natives. Man's disturbance has also given rise to migrations of original elements, which are movements much more difficult to appraise. Many species are restricted to certain natural associations and excluded from others, not so much by climate and edaphic requirements as by competition. Once man alters the balance to a significant degree, the bars are broken and outside species may establish themselves. Such movements are sometimes interpreted incorrectly as indicating a change in climate.

Costa Rica possesses within a relatively small area one of the richest vegetations in the world, which not long ago covered the country from coast to coast. Lying well within the tropical region, which normally has a more complex vegetation than temperate regions, it is also the meeting ground of northern and southern floras. The wide range in altitude, precipitation, and edaphic factors causes frequent and profound changes even within remarkably short distances. Costa Rica is essentially a humid country, with a

large percentage of its surface covered by formations in which precipitation exceeds potential evapotranspiration. It lacks several of the dry formations found from El Salvador to Mexico and in northern South America.

The country has five altitudinal belts: the Tropical, the Subtropical, the Lower Montane, the Montane, and the Subalpine. Though their upper limits cannot be assigned a set figure other than that of temperature, there is a vertical relation among the widths of the belts that are above the basal Tropical Belt. The Tropical Belt rises, with local modifications, 500 to 600 meters on the Caribbean slope and about 700 meters on the Pacific slope. Its upper limits are generally lower on the Caribbean side than on the drier Pacific side, a result of the cooling effect of greater cloudiness and heavier precipitation. The Subtropical Belt has a vertical range of about 1000 meters to the upper limits of the commercial coffee plantations at an altitude of 1400 or 1500 meters. The next belt, the Lower Montane, rises another 1000 meters or so to 2500 or 2600 meters above sea level. The Montane Belt extends upward approximately another 1000 meters to the Subalpine paramo atop the highest peaks, such as Chirripó. Both the Montane and Subalpine belts have a very restricted area in Costa Rica.

TROPICAL BELT

The life-zone map shows three formations in the Tropical Belt:

TROPICAL DRY FOREST

The subhumid Tropical Dry Forest formation, typical of the province of Guanacaste, with a dry season of approximately five months, is found in the northwest. From sea level it rises to include Atenas and approaches Villa Colón, San Antonio de Belén, and Grecia on the central plateau. Originally it supported some of the richest stands of tall deciduous forest, though with significant local variations and few species covering the whole area. Because of the high percentage of valuable timbers in this formation and the ease with which grasslands can be maintained by the use of fire, man has considerably altered the original vegetation; the forests have been greatly reduced in area and severely despoiled of the better trees. On the better soils large

areas have been cleared for cotton, sugar cane, or other crops, and beef cattle are raised throughout Guanacaste. In recent years, overpopulation in the highlands has resulted in much heavier settlement and land utilization in this formation.

The typical forest association includes *Tabebuia chrysantha*, *Swietenia humilis*, *Pithecolobium saman*, *Astronium graveolens*, *Guazuma ulmifolia*, *Ceiba pentandra*, *Sloanea quadrivalvis*, *Bombacopsis quinatum*, and the coyol palm (*Acrocomia binifera*). One of the characteristic trees, *Enterolobium cyclocarpum*, is popularly called "guanacaste." Where the water table is high in fertile soils, such as river flats, a taller and more luxuriant forest occurs, with the addition of *Brosimum* spp., *Anacardium excelsum*, the corozo palm (*Scheelea*), and other species from the Tropical Moist Forest. This association has a much greater tendency to an evergreen condition than the other Dry Forest associations. On limestone soils and on hills with shallower soils, the vegetation is somewhat drier.

From Cañas to beyond Liberia extends a zone of very poor soils derived from pumice rock on which *Byrsonima crassifolia* and *Curatella americana* form a very distinctive association which *Quercus oleoides* helps to characterize. As *Byrsonima* and *Curatella* are extremely fire-resistant, they are found not only on originally infertile soils but also on those seriously degenerated by excessive cropping and burning. Here *Quercus*, normally a cool-climate genus, drops close to sea level, clearly indicating the fact that species distribution often depends on lack of competition rather than on specific climatic conditions.

The original savannas were restricted to swampy areas and certain extensions of shallow soils where the trees could not live through the entire year. The present "savannas" are the result of burning and extensive clearing together with the introduction of exotic pasture grasses.

TROPICAL MOIST FOREST

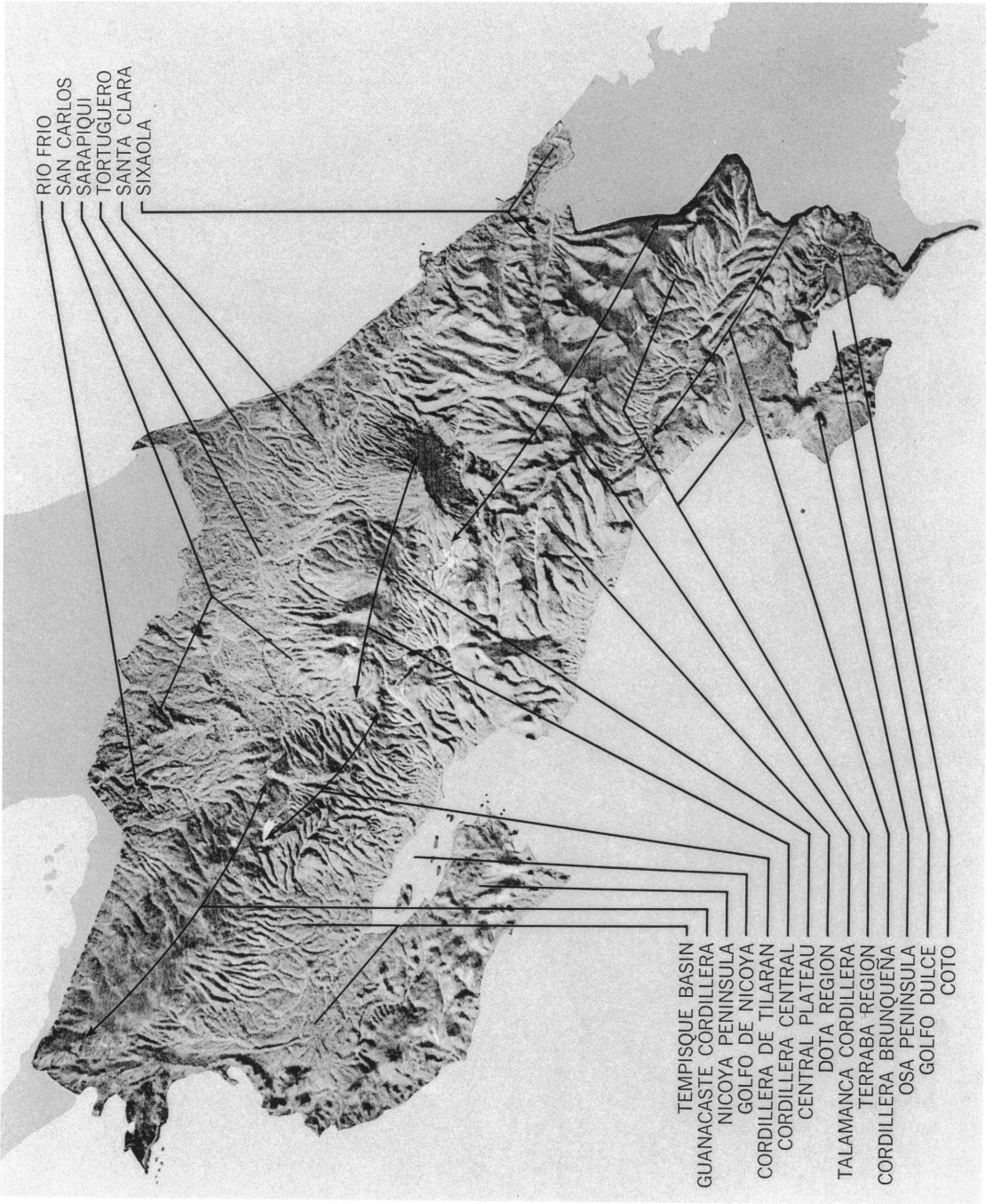
The Tropical Moist Forest formation contains, in Middle America, the most extensive lowland natural forests that still remain. In Costa Rica it covers most of the Caribbean lowlands, including the first hills, and the

larger part of the Pacific side over its southern half, from the Herradura Mountains, west of Parrita, to the Panama border. In contrast to the Dry Forest, this formation comprises tall, predominantly evergreen forest with three or four stories and approximately 100 tree species in the associations on good soils. Variations in the stands reflect special soil conditions. Insufficient study precludes dividing this formation into associations.

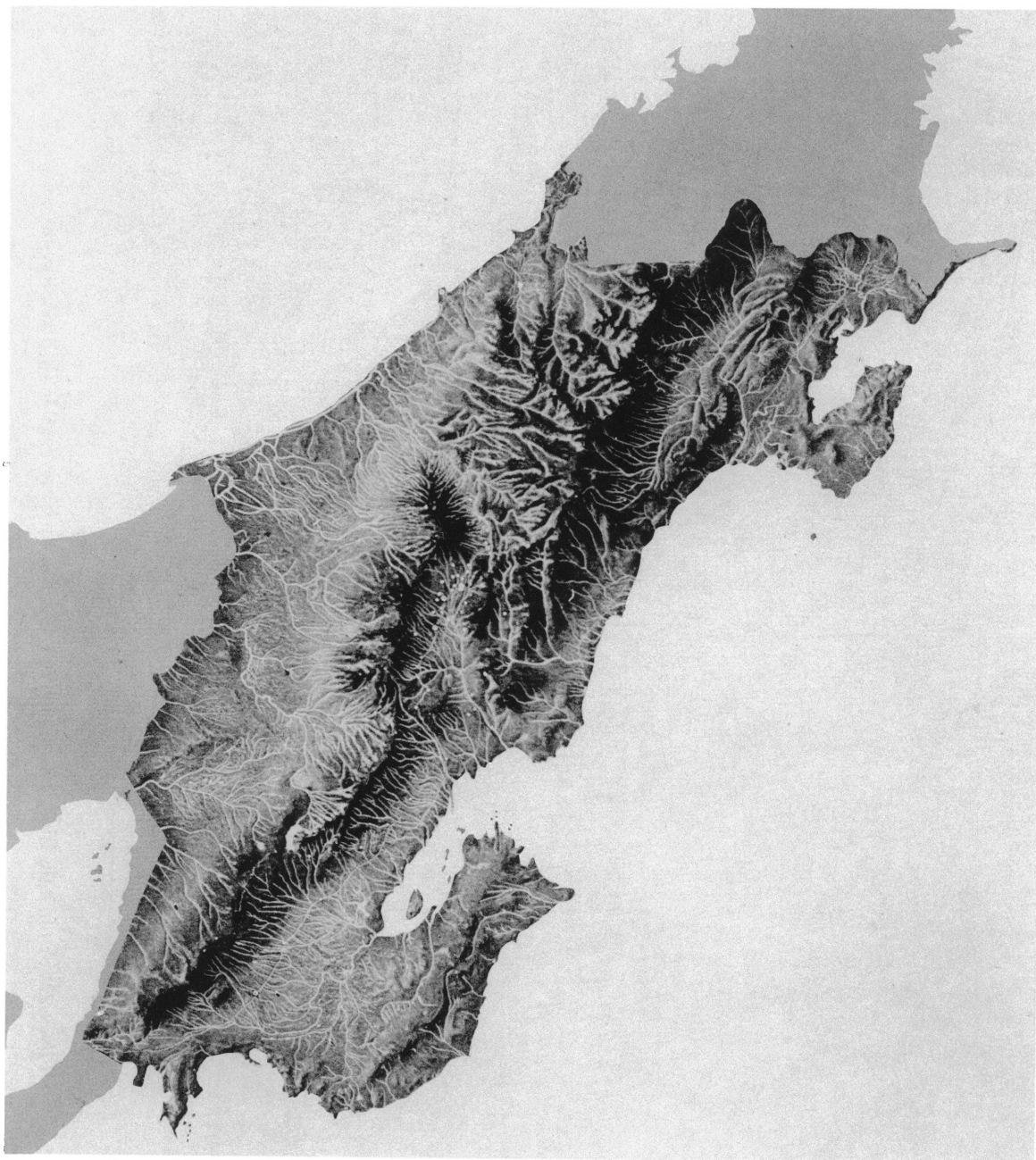
Where untouched, the climatic association conforms to the popular conception of tropical "rain" forest. The lofty main canopy is almost closed, and above its mass project the crowns of great emergents. The majority of the trees have straight trunks free of branches for almost three-quarters of their total height. Compared with those of the dominants of the Tropical Dry Forest, the branches tend to be of smaller diameter and to angle upward instead of extending laterally; the crowns, shaped like inverted cones, tend to be more compact and smaller in relation to the height and breadth of the trunks. These tendencies probably correspond to the greater availability of soil moisture throughout the year. The shade-tolerant trees of the lower strata are characterized by relatively thin trunks with small, generally conical crowns and include a fair number of palms. Despite a certain mixing, each layer is composed largely of distinct groups of arboreal species and life forms.

Away from the climatic associations one notes a reduction in structure, density, and floristic complexity. The dominant trees are not so tall and thick, and the number of species is smaller. On excessively humid soils the proportion of palms is greatly increased. Many are characterized by stilt roots, as are also some small hardwoods of the understory. Only in the truly hydric associations is the primary vegetation so impoverished that it lacks any value as timber. In less flooded situations the hardwoods tend to be well isolated from one another, whether small or medium-sized and branched below or big, with wide crowns and spindle-shaped trunks.

Typical tree species are *Anacardium excelsum*, *Brosimum* spp., *Luehea Seemannii*, *Cordia alliodora*, *Castilloa* spp., *Pentaclethra macroloba*, *Cedrela mexicana*, *Cecropia* spp., *Virola* spp., *Guarea* spp., *Vitex* spp., *Calophyllum brasiliense*, *Terminalia amazonia*,



Physiography of Costa Rica. Photograph of relief map by Ulises Ugalde U., 1952, San José, Costa Rica



River systems of Costa Rica. Photograph of relief map by Ulises Ugalde U., 1952, San José, Costa Rica

Dialium guianense, *Tabebuia pentaphylla*, *Ochroma lagopus*, *Manilkara* spp., *Minquartia guianensis*, *Coumarouna panamensis*, and *Eschweilera calyculata*. A high water table or other special edaphic conditions support special associations. These include palm swamps and mangroves, concentrations of *Carapa guianensis*, and, on riparian flood lands, pure stands of *Prioria copaifera*. The mangrove association occurs also in the dry formation, but is not so tall. The only "savannas" are in the southwest around Buenos Aires and Potrero Grande, not because of climate but owing to special edaphic conditions and to continual and prolonged burning.

Until recently, agricultural use of this formation was somewhat limited to such major crops as bananas, abacá, and cacao, mostly on alluvial plains. Because of population pressure in other formations coupled with the control of malaria in this one, settlements and new clearings are moving in rapidly. Large-scale deforestation in the Tropical Dry Formation has caused a turn of attention to the many useful timbers in these forests. Conversion of forest to grazing lands and considerable cultivation of corn and rice are in progress. However, the heavy rainfall may not permit long-continued clean culture, and many abandoned areas returned to second growth are in evidence. Among the second-growth trees that appear most rapidly are *Cordia alliodora*, *Ochroma lagopus*, *Trema micrantha*, and *Goethalsia meiantha* along with many Solanaceae, Rubiaceae, and *Piper* shrubs.

TROPICAL WET FOREST

The Tropical Wet Forest is present in the northeast (and the adjoining sector of Nicaragua) and in the Golfo Dulce lowlands of the southwest. It is also present, though unmapped, either as small patches or probably as a corridor along the Caribbean foothills into Bocas del Toro Province, Panama. Data are insufficient from which to formulate specific descriptions. Paul Allen (1956), who collected intensively in the southwest, has turned up many new records of South American species as well as a considerable number of new species. (Also see Petriceks [MS] and Slud [1960].)

The forests are taller and denser than those

in the preceding formation and floristically are the most complicated in the world. The exuberance, however, gives a false impression of the agricultural potential. The ground and vegetation are almost always saturated, and the ecological balance between the primary forest and the soil is precarious. Probably many of the arboreal species of the Tropical Moist and Subtropical Wet Forests are also present in this formation, even including some from the Tropical Dry Forest under special local edaphic conditions.

The vegetation is lush, many of the trees are buttressed, stilt roots are common, and palms are frequent. Lianas, whether soft and flexible or thick and twisted or coiled, occur everywhere. The branching and foliage of the great vines are largely intertangled with the high crowns, hence cannot be appreciated properly from below. Notable for their frequency and specific diversity are the Araceae, plants with pretty leaves and twining, climbing stems that cling to thick trunks in uncommonly large masses. Though not especially characteristic of this life zone, other obvious features are the great abundance of epiphytes and the frequent occurrence of the woody stranglers, *Ficus* spp. and *Clusia* spp.

SUBTROPICAL BELT

The Subtropical Belt lies between the upper limits of the Tropical Belt, marked approximately by the 24°-C. isotherm, and the lower limits of frost, or, in the wetter districts, a line of critical temperature that produces the same restrictive effect. Though it is often considered a part of the true tropics, its lower temperatures are much more agreeable to man, and the vegetation changes accordingly. Mainland Middle America contains considerable areas within this belt. In Costa Rica it comprises three formations.

SUBTROPICAL MOIST FOREST

The Subtropical Moist Forest formation is typical of the coffee zone of the central plateau. On the Caribbean versant it is present only in the general vicinity of the city of Cartago. It also forms a narrow belt along the Pacific slope of the continental divide in the northwest. Though not mapped, it may also cover the low mountains of the Nicoya Peninsula. Because of its rather evenly dis-

tributed warm-temperate temperatures, absence of frosts, and optimal relation between precipitation and potential evapotranspiration, the majority of the cultivations in the neighboring formations, both the warmer and the cooler, are also planted here. The associations on good soils are now virtually nonexistent, because they furnish the best conditions for coffee. As coffee is grown here under shade, the plantations are essentially forests that provide rather satisfactory protection to the soils and produce large quantities of firewood from the pruning and occasional changing of the shade trees.

The good soils can support a relatively tall and dense evergreen forest with an almost unbroken canopy that provides shade and returns large quantities of organic material to the ground. The majority of the trees are of little use as timber and therefore are little known. They include *Eugenia* and various members of the Myrtaceae, *Persea caerulea*, *Phoebe mexicana* and other Lauraceae, *Croton* spp., *Hauya lucida*, *Erblichia odorata*, *Dussia* sp., *Albizia adinocephala*, and, in the lower part of the zone, *Myroxylon balsamum*. Reark [MS] described a *Conostegia xalapensis-Zanthoxylum Limoncello* association which is probably indicative of poorer soils.

SUBTROPICAL WET FOREST

The Subtropical Wet Forest is denser and much more extensive than the preceding on both slopes the length of the country. Large tracts of original vegetation still exist, because only the areas with recent volcanic soils of good structure have been given over to coffee and other agricultural products. The climatic soils, however, rapidly lose their fertility and structure when cleared and are not normally very satisfactory for clean cultivation. Because of the high rainfall and rugged terrain, most of the formation should be set aside for watershed protection.

The climatic association in its original state is a tall evergreen forest with four stories and large emergent trees. Stands are very dense with a sparse understory of bushy and herbaceous growth. The great plank buttresses and stilt roots, so common in the humid tropical belt, are in general less common and smaller in this formation. Locally about 50 distinct tree species are found in a

stand, but more than half of these make up the lower strata and never attain large size. Succession is slow on extensively cleared areas.

The forests are characterized by various species of the family Lauraceae, also *Lafoensia*, *Mauria*, *Talauma gloriensis*, and other lesser known species. The lower part of the zone is more complicated because of the additional presence of a number of tropical-belt species, such as *Cordia alliodora*, *Ochroma lagopus*, and *Goethalsia meiantha*, which range to an altitude of some 800 meters.

Reark [MS] described two associations from the upper Reventazón Valley, the *Cedrela mexicana-Simaruba glauca* association and, at a higher elevation, the *Cedrela Tonduzii* association. In the former, the dominants attaining a height of 100 feet were: *Cedrela mexicana*, *Ceiba pentandra*, *Chaetoptelea mexicana*, *Engelhardtia pterocarpa*, *Quercus Guglielmi-trelesi*, *Q. tomentocaulis*, and *Sideroxylon Capiri*. This association had an understory 20 to 30 meters in height and several smaller trees under 15 meters. In the second association, only *Cedrela Tonduzii* and *Sideroxylon Capiri* were found as dominants.

Normally the competition from broad-leaved trees is too severe to permit the entrance of pines into this formation, though this does happen on inferior soils farther north in Central America. There are no native pines anywhere in Costa Rica.

SUBTROPICAL RAIN FOREST

The Subtropical Rain Forest is found to a limited extent on the mountains. It does not appear on the life-zone map because of its small area and our insufficient knowledge of its distribution. Owing to the rapid deterioration of the soils and the very high rainfall, this formation is quite unsuitable for permanent agriculture and will be of greatest importance as a stream-regulation forest.

The greater part of the life zone is covered with forests that belong to edaphic associations. Where the climatic association does exist, it is very similar in appearance to the Subtropical Wet Forest, from which it differs principally in having a higher proportion of palms and tree ferns in the lower strata and the understory. It is distinguished from the other associations by its superabundance of

mosses, lichens, and ferns that cover the trunks and branches and even the old leaves. It also features succulent climbers, lianas, and many epiphytes on the upper branches of the dominant trees.

The edaphic associations on the steep slopes are reduced in height. The trunks of even the dominant species rarely become very thick, and the crowns are relatively small and generally deformed. Palms are abundant in the upper strata. In many places, probably the scene of former slides now covered with second growth, the vegetation is largely herbaceous and bushy.

Reark [MS] found two associations in the vicinity of Orosi and Tapantí. One, which he named the *Sideroxylon uniloculare-Pachira aquatica* association, contains *Cedrela mexicana*, *Pachira aquatica*, *Sideroxylon uniloculare*, and an undetermined species of *Ocotea* as dominants of about 35 meters in height. The second, which he named the *Quercus Guglielmi-treleasi-Chaetoptelea mexicana* association, contains only the two species given in the name plus *Cedrela mexicana* as dominants.

LOWER MONTANE BELT

The Lower Montane Belt in Middle America is quite extensive in Guatemala and southern Mexico and again in Costa Rica. In Honduras and El Salvador, it occurs only on the tops of the mountains; in Panama, in the section around Chiriquí Volcano and possibly eastward into Veraguas Province. The drier parts were favored settlement areas of the pre-Columbian Indians, which helps explain the little information available concerning the natural vegetation on the good soils. Such soils have been dedicated for centuries to the cultivation of maize; more recently, in the upper part of the belt, to wheat and potatoes. The climatic associations of the three formations in Costa Rica generally contain 25 to 30 tree species.

LOWER MONTANE MOIST FOREST

The Lower Montane Moist formation rises from the upper limits for the economic production of coffee, plantains, sugar cane, rice, and other plants of the tropical and subtropical belts. Its upper limit coincides approximately with that for the economic pro-

duction of corn. This life zone affords excellent prospects for a permanent agriculture on the satisfactory soils, but it occupies only a very small area in the protected, less rainy zone behind Irazú Volcano, as shown on the map (fig. 1). It is also present, though not shown, on the west slope of Poás Volcano and possibly along the Pacific slope of the Talamanca Cordillera.

The climatic association appears to have two strata of trees plus another of tall shrubs. Locally, fewer than half of the expected number of tree species are to be found with any frequency. Neither the intermediate layer nor the understory is very dense. Both are composed of species of little value that never reach large size and are characterized by some dominant young elements, especially members of the Lauraceae. Tree ferns occur with moderate frequency and, in more humid places, highland palms and *Chusquea* thickets. On the ground, smaller plants resistant to dryness and cold are plentiful: lichens, mosses and club mosses, ferns, terrestrial herbs, and peperomias. Epiphytism, in general, is somewhat reduced. Orchids and bromeliads are present but not especially abundant on the branches and higher crotches, and they tend to be small in size. Lianas are few, and climbers are small and scarce.

The original forest on Irazú is virtually extinct, but it contained trees such as *Eurya theoides*, *Rhamnus pubescens*, *Citharexylum Lankesteri*, *Meliosma irazuensis*, and others, with *Quercus irazuensis* and *Q. aaata* on somewhat poorer soils. Reark [MS] has described a *Quercus aaata-Q. yoroensis* association in which the dominants include another five species of oaks.

LOWER MONTANE WET FOREST

The Lower Montane Wet formation is very similar to its warm-temperate counterpart, the Subtropical Wet, but its average daily and absolute minimum temperatures (probably 3° to 6° C.) are too low for typical plants of the warmer belts. It is unlikely that temperatures go below freezing in view of the high humidity and cloudiness. The "dry" season lasts an average of two months; during the rest of the year the soil and vegetation are almost continuously wet. This formation has been much less utilized for cultivation than

the preceding and is mainly restricted to the dairy industry.

The climatic association occurs only as separated small tracts on slopes of low or moderate gradient. It is evergreen, dense, and tall, with an impressive appearance in the virgin state. The large trees have straight trunks free of sizable branches for two-thirds of their total height, which varies between 25 and 30 meters. The trees of the two lower strata have very slender, frequently bent and defective trunks. In some places, the emergents attain a height of some 40 meters.

The heavily shaded shrubby and herbaceous vegetation of the understory and at ground level is generally thin. It includes tree ferns, small palms and other monocotyledonous shrubs, many climbers, and, in small openings, *Chusquea* spp. Many ferns and mosses and a thin layer of dicotyledonous herbs overlie a thick carpet of organic fragments on the forest floor. As in the other very humid life zones, the smaller plants that require light are found lodged in the crotches and crowns of the dominant trees, which are often laden with epiphytes, especially orchids and bromeliads. Climbers, ferns, mosses, and lichens occur in moderate to great abundance on the shaded boles, but the lianas so common in the lowland forests are scarce and reduced in size. Larger palms are fairly frequent in the intermediate story.

The trees of the climatic association are in large part species that can also develop as shrubs. They are important components of primary forest on deep soils and form special associations on the poorer, shallower soils of steeper slopes. In general, these edaphic associations are less complex floristically and consist of two arboreal strata rarely exceeding 15 meters in total height. Owing to the instability of the soil, the dominants frequently lean or bend over. The upper part of the stand is less dense than the lower part, which is full of climbers, *Chusquea*, and tree ferns. On poorer soils the vegetation becomes dwarfed over considerable areas.

Another common vegetation type of secondary character establishes itself on bare ground exposed by washouts and landslides. Where the subsoil is loose and deep, succession is rapid and exuberant. The first invaders always form tangles made even more im-

penetrable by vines and tendrils. On rocky outcrops or stony subsoil, succession is slower. In the early stages the largely herbaceous and bushy vegetation consists of many lichens and mosses, ferns, orchids, some begonias, *Gunnera*, various grassy bromeliads, shrubs, melastomes, and other bushes that reach tree-sized dimensions in the nearby primary associations.

The formation is quite extensive in Costa Rica and contains some good timber species and several temperate-region genera; similar associations grow on rich soils in northern Central America. Among the trees are *Cornus disciflora*, *Cedrela Tonduzii*, *Alnus jorullensis*, *Magnolia poasana*, and *Persea Schiedeana*. On somewhat poorer soils are found oaks in almost pure stands, such as *Quercus oocarpa* in the lower part of the zone and *Q. copeyensis* in the upper part. Reark [MS] has described a *Quercus tomentocaulis*-*Cornus disciflora* association and, on high-water-table soils adjoining the *Q. copeyensis* associations, a much lower association or fasciation of the former, dominated by *Podocarpus oleifolius*, *Weinmannia Wercklei*, and *Quercus copeyensis*.

LOWER MONTANE RAIN FOREST

The superhumid Lower Montane Rain Forest, because of its isolation and heavy precipitation, is not well known. It may occur farther north but to date has been described for Central America only by Reark [MS] in Costa Rica. He established three associations. The first was dominated by *Quercus corrugata* and *Q. Guglielmi-treleasi*. The second association is interesting in that the three dominant trees all belong to the Lauraceae. Only one of these, *Ocotea Austinii*, had been known to science. On the slope of Irazú he found another association dominated solely by *Ocotea Austinii*.

This formation is similar to its warmer counterpart, the Subtropical Rain Forest. Orographic rains and heavy cloudiness are an almost daily occurrence even during the "dry" period when the air at lower elevations is little saturated. The relatively enormous quantity of rainfall has dire consequences, especially when one considers the extremely rugged topography and the cool temperatures. Less than 20 per cent is returned directly to the atmosphere. The remaining 80

per cent, or more than 3000 mm. (120 inches) annually, is pure runoff, even under natural forested conditions, and a multiplicity of watercourses on narrow rocky beds are rapid and turbulent almost the entire year. There is probably little monthly, weekly, and daily variation in temperature, as the almost continuous heavy cloud cover impedes the radiation and irradiation of heat. In not a single month is the mean rainfall less than the potential evapotranspiration or does the sun shine brilliantly many hours a day. Thus, the very climate contributes in large part to the extreme conditions of the topography, the soils, and the vegetation, reflected by the poor appearance of the forests.

The natural vegetation is reduced in stature, the upper strata reaching a height of only 20 to 25 meters. It consists largely of slender, poorly formed trees with small and partially dead crowns. One notes a tremendous amount of epiphytism in these woods, principally lichens, mosses, and ferns clothing the trunks, branches, twigs, even old leaves, and an abundance of orchids and bromeliads in forks and on the main branches of the dominant trees. The understory is normally very dense and contains a large number of tree ferns. As in the Subtropical Rain formation, there are numerous breaks in which the natural vegetation is in large part herbaceous and shrubby.

MONTANE BELT

The Montane Belt, occupying the lower portion of the "tierra fría" between the mean annual biotemperatures of 12° and 6° C., is restricted in mainland Middle America largely to Mexico and Guatemala, with small areas in Costa Rica and adjacent Panama. It is found, of course, only on the high mountains.

MONTANE MOIST FOREST

The Montane Moist Forest (not shown on the map), so far as known, is confined to a small area high in the rainfall shadow of Irazú Volcano. Nevertheless "dry" years are rare; on the other hand, years with rainfall in excess of normal agricultural needs are frequent. The factor most limiting to agriculture is the low thermal efficiency.

The better soils support a closed forest with

between 10 and 15 species of trees. Characteristic are *Quercus costaricensis*, *Arctostaphylos costaricensis*, and *Mahonia paniculata*. Of the two known associations, one is dominated by *Quercus costaricensis*, the only large tree of this life zone in Costa Rica. The other may be termed the *Arctostaphylos costaricensis-Vaccinium consanguineum* association after its two most abundant species.

MONTANE WET FOREST

The Montane Wet Forest (not shown on the map) occurs only in small areas that are transitional.

MONTANE RAIN FOREST

The Montane Rain Forest is characterized by two extreme factors: excessive humidity and abrupt topography with pronounced relief. Almost daily there are rains, heavy mists, and a cover of low clouds. The soil and vegetation are almost continuously saturated; normally there is no "dry" month. The larger part of the total precipitation is strictly orographic, but an appreciable portion condenses directly from the supersaturated air and the clouds on all the vegetation, the soil, and the exposed rocks. Probably more than 75 per cent is eliminated as runoff or seepage.

Almost the entire area supports a dense cover of natural forest. It is a mixed forest, but contains only 12 or 13 tree species in the climatic association. The trunks tend to be deformed or twisted and markedly spindle-shaped, internal defects are common, and the volume per hectare is low. The dominants rarely reach a diameter of 1 meter; the average is between 25 and 50 cm. Because of the wind and the instability of the soils, many lean markedly or bend over. The crowns are typically small or open, with many dead branches. The leaves are small, hard, and grouped at the extremities of the branches. From fallen but still-rooted trunks rise new branches that resemble multiple saplings.

This forest has a maximum development of epiphytic growth. Dense colonies of lichens, algae, mosses, and ferns cover the trunks, branches, and even the leaves, while larger limbs are overburdened with bromeliads, orchids, and climbing plants. The understory is crowded with perennial herbs, shrubs, and

slender climbers. Here too are found thickets of the ubiquitous *Chusquea*. In its virgin state under forest cover and on moderate slopes, the soil has a moderate depth. Its surface is covered with partially decomposed trunks, dead leaves, superficial roots, and layers of organic materials and humus.

The character of the secondary vegetation depends in part on its antecedents. Bare soil exposed by a large landslide is frequently reoccupied by the rapidly growing *Alnus jorullensis*. Where despoiled of the larger trunks, as at the site of a small slide, the ground is soon invaded by a thick cover of *Chusquea* which hinders the establishment of arboreal species for many years.

Reark [MS] described several associations from the high wet slopes of the central highlands. One is the *Buddleia alpina-Escallonia poasana* association which, in addition to these species, contains *Oreopanax xalapense*, *Weinmannia pinnata*, *Miconia biperulifera*, *Rapanea Pittieri*, and a few others. Many Ericaceae shrubs among the epiphytes commonly cover the trees. The association is used

to a certain extent for dairying with plantings of the grass *Pennisetum clandestinum* from the mountains of Africa. Another association, on the Talamanca range, is dominated by *Weinmannia pinnata* and *Quercus costaricensis*. Other trees among the dominants are *Drimys Winteri* and *Podocarpus Standleyi*. *Quercus costaricensis* and *Podocarpus Standleyi* are abundant on the poorer soils. Two minor treeless associations that cover limited areas are the *Chusquea subtessellata* association on exposed slopes and the *Puya dasylirioides-Lomaria Wercklei* association in bogs filled with *Sphagnum* mosses.

SUBALPINE BELT

SUBALPINE WET PARAMO

The Subalpine Wet paramo, crowning the high peaks of the Talamanca Cordillera above tree line, is affined botanically to the paramos of South America. The formation consists of a low bush and other plants here at their northernmost limit. The species include the bromeliad *Puya dasylirioides*, the ferns *Jamsonia* spp., and other Andean plants.

REMARKS

This report is an annotated check list, with distribution viewed from an ecological perspective. It has no pretensions to being a taxonomic treatise, though here and there I offer opinions, derived in the main from watching the living birds, as to the rank of allopatric forms. As Costa Rica in relation to its small area (20,000 square miles) has possibly the richest bird life of any country of comparable size in the world, the most practical way to distribute the species is according to an ecological scheme, preferably one of universal applicability.

In preparation, I entered the known localities for each species on individual work maps that contained the outlines of the life zones of Holdridge in the belief that only on such a map is it meaningful to plot, in the sense of describing, animal distributions. (See Slud, 1960, pp. 72-74.) Evaluating this information strictly in the light of my own experience, I broadened the ranges of many species, altered or refined them for others, and gave them point by indicating centers of abundance. Comments on habitats, habits, and voice, except where

expressly cited from the literature, are also based entirely on my own observations.

My aim was to distill the essence of the day-to-day activities of the birds. I have been least successful with some of the most common species, usually the most-generalized ones in their respective groups, and with terrestrial birds in general, also nightjars, owls, and swifts. In view of the many factors involved in distribution, a number of my notations may emerge eventually as significant to some degree in one or another context, whether here in Costa Rica or elsewhere in the ranges of the birds. For example, a species that regularly attends army ants elsewhere in its range may not do so in Costa Rica. In short, I have tried to construct a synecological frame into which autecological findings will fit, as the birds do not each live in a vacuum.

Our ignorance of the influences that control the occurrence of almost any species is revealed when, for example, a bird of obviously specialized feeding habits and habitat is missing under apparently suitable conditions.

The ranges of the birds sometimes do, but generally do not, conform neatly to the life-zone boundaries. It would be illogical to expect birds to be distributed solely by temperature and precipitation. Apportioned by life zones or parts thereof, they give a picture of the range of climatic and vegetational conditions under which they thrive or which they tolerate.

Whether or not the birds parallel the trees in doubling the number of species with each descent to the next lower belt, they do show a related progression. Unquestionably the number of bird species decreases sharply with increasing elevation upward from the lower portion of the subtropical belt, except in transitional areas. Because of the motility and seasonal altitudinal migrations among many more species of birds than is generally realized, a distributional investigation should begin with the sedentary reproductive period. Any regional or local population study will not become truly comparative and scientifically useful until it is correlated with the habitats in the frames of reference of the plant associations within the larger framework of the life zones. Similarly, the place to draw a transect must be chosen with care as it should follow the same humidity province throughout its length. The climatic associations should be studied first, as a basis for comparison with other associations.

It has already been made clear that a plant formation or life zone consists of a group of physiognomies, each corresponding to a particular kind of association, which are characteristic of that life zone. The associations and subassociations may, or may not, be equivalent to habitat types. Within a single formation it would appear that different forest associations share the same species but in differing numerical ratios, especially on different topographies. Two similar associations in adjacent formations in the same belt or in contiguous portions of belts in the same humidity province would also appear to have virtually the same complement of birds, though the relative abundances may differ markedly.

On the other hand, a habitat type, such as an open marsh, "savanna," or a particular stage of succession, may be inhabited by its own appropriate set of birds and be present in

a number of associations in several life zones. Apparently minor differences in physiognomy of vegetation do not override the basic requirements for survival of birds that are widespread. Other species are restricted to the habitat type wherever found within a single life zone or perhaps in two or three life zones adjacent to one another climatically though not necessarily geographically. Thus a thicket-inhabiting land bird may have an island-like distribution, just as a fresh-water species, coincident with the distribution of the habitat.

An interesting set of intermediate conditions is exemplified by the Río Frío region of the northwestern Caribbean lowlands near Lake Nicaragua. This seasonally flooded area resembles the Guanacaste lagoon country in the Tropical Dry Forest in appearance, but the higher rainfall and concomitant shorter dry season place it in the Tropical Moist Forest Life Zone. Present are a number of birds of fresh-water habitat that are otherwise known in Costa Rica only from Guanacaste. Other species of this habitat in Guanacaste are unaccountably absent, in the current state of knowledge, from the Río Frío region. Among the land birds at Río Frío, several are known only from the Pacific slope; the others are Caribbean species. As the Río Frío region is not surrounded by forest but is continuous with similar open country in adjacent Nicaragua, availability of the habitat becomes a factor for some species as well as climatic requirements for others.

The mountainous Dota region on the Pacific slope, south of the central plateau and merging with the northern sector of the high Talamanca Cordillera, is another confused area. Despite its geographic position, it is under the Caribbean climatic influence, and its avifauna is predominantly that of the wet highlands and the middle elevations along the Caribbean slope. As might be expected, a number of more or less strictly southwestern species of the very humid subtropical belt also occur here. Unexpectedly, several birds characteristic of the drier northwestern quadrant of the country have been found here at their southern limit.

The continental divide in the northwest merits a few remarks. The northern portion, known as the Guanacaste Cordillera, consists

of several volcanoes and peaks separated by relatively low gaps. The southern portion, known as the Cordillera de Tilarán, is not volcanic and consists of a more or less continuous high ridge merging at its southern end with the Cordillera Central. The Guanacaste and Tilarán Cordilleras are separated by a low gap, occupied in part by Lake Arenal, where they are displaced and bypass one another somewhat (pl. 1). Their Pacific slopes, down to lower subtropical elevations, locally lower, are under the Caribbean climatic regime, and the birds are preponderantly Caribbean. In addition, an avifaunal extension from the Cordillera Central is found along the Tilarán ridge, but many of these highland species do not cross the Arenal gap to the Guanacaste Cordillera. Several forms, which are otherwise strictly southwestern, range along the humid Pacific face of the Tilarán Cordillera at lower elevations. A few others are restricted to the Guanacaste Cordillera or occur there but not on the Tilarán Cordillera.

The Tilarán ridge reaches upper subtropical to lower lower-montane elevations, but, as with the plants, the superhumid conditions permit the entry of higher-altitude species from the central highlands. Apparently cool and very wet climates at lower elevations are tolerated by species that normally dwell higher under cooler but not quite so humid conditions. Examples are *Zeledonia* and *Scytalopus*, which are most abundant at lower montane and montane altitudes but also occur, both on the Tilarán ridge and elsewhere, in the superhumid life zones downward into local tracts of Subtropical Rain Forest. Similarly, a number of other high-altitude species descend cloud-forested pockets, almost invariably on precipitous slopes, not uncommonly to 3000 feet and occasionally to about 2000 feet above sea level.

A fundamental problem in ecological distribution is presented by the humid to wet Caribbean and southwestern Pacific slopes. The principal climatic difference between the two is that the Pacific side is subject to less atmospheric influence and has a better-marked dry season. At present, the "rain"-forested southwest is effectively isolated from the subhumid northwest, where the limiting factor seems to be the long dry season, and

from Panama, the Pacific side of which rapidly becomes drier eastward from approximately the Costa Rican border (see Holdridge and Budowski, 1959). It is separated physiographically from the Caribbean slope by the high Talamanca Cordillera.

The distinctiveness of the southwestern avifauna (including adjacent Panama) indicates that it had been isolated in the geologic past, perhaps at the same time as the Costa Rica-Chiriquí highlands. Distributional barriers of peculiar placement may have blocked the entrance of certain ecological types. The area completely lacks jays and native orioles (*Icterus*). Not a single small owl (*Otus* or *Glaucidium*) has been reliably reported. Only one motmot, of the five in the country, is known to occur, and three of the five puffbirds are missing. Of the three members of the genus *Aratinga* in the country, the single species present has barely penetrated the Golfo Dulce region, undoubtedly from Panama. The meadowlark (*Sturnella magna*), as an example of a widespread species, is oddly absent, despite the presence of what appears to be eminently suitable habitat. On the other hand, it is difficult to explain the almost exclusively southwestern occurrence of two species, *Dendrocincla anabatina* and *Ornithion semiflavum*, both at their southern limit and well separated from the bulk of their populations which range from southern Mexico to Nicaragua. Either they followed a humid corridor along the Pacific face of the northwestern divide after having passed through gaps from the Caribbean side, or they may have been distributed through Guanacaste, which was forested and perhaps more humid than now.

The majority of the bird species occur both on the Caribbean side and in the humid southwest. While the southwest has a number of characteristic species of its own (including "savanna" birds), the Caribbean slope has a much larger number confined to it. The southwestern "savanna" birds are almost all of South American origin and include no species that is typical of Guanacaste. The single "savanna" species that is not here at its northern limit is, however, quite absent from the dry-forested northwest. Unlike the trees, of which several Guanacaste species are found under special soil conditions even in the

wet-forested Golfo Dulce region, the birds show no such out-of-range occurrence.

The birds of the humid Pacific slope are matched on the Caribbean side by a congeneric species in a number of instances and apparently by a familial or extra-familial counterpart in some others. This leaves several Pacific species without a Caribbean representative, while many Caribbean species, including a number of genera and several families, have no Pacific representative. This imbalance would not lessen appreciably even if several of the Caribbean species should be found eventually in the far southwest.

Though the southwest has a smaller avifauna (including the "savanna" species) than the Caribbean slope, the length of a list of birds compiled at two comparable sites would appear to be approximately the same. Evidently many of the birds common to both slopes have a broader vertical range in the southwest than on the Caribbean side. A number of species virtually restricted to the subtropical belt and the middle altitudes on the Caribbean side are regular members of the tropical-belt avifauna in the southwest. In only a few instances do we have the opposite situation, such as that exemplified by the woodland-inhabiting wren, *Henicorhina leucosticta*, the Caribbean form of which is abundant from the lowlands upward into the subtropical belt while the Pacific form is scarce to absent at low elevations in the southwest.

Apart from the endemic element in the highlands, political Costa Rica, quite unexpectedly, has all four of its corners faunally significant as distributional or ecological boundaries or areas of transition.

1. In the northwest, the lowlands funnel into the isthmus between Lake Nicaragua and the Pacific Ocean, and the Guanacaste Cordillera becomes a low ridge separating the narrowed Pacific slope from the broad Caribbean lowlands (pl. 1). Thus, the Guanacaste avifauna, a portion of which is sub-specifically demarked, is narrowly connected with the arid Pacific avifauna of Central America and Mexico to the north. I suspect that a number of birds of fresh-water habitat arrive seasonally from Lake Nicaragua via this corridor. Also, the open southern shore along Lake Nicaragua probably allows access

to the Río Frío region and provides a route to northern Guanacaste.

2. The very wet northeastern corner is a forested lowland that appears continuous with extreme southeastern Nicaragua climatically and in the absence of physiographic barriers. I cannot see how the intersecting Río San Juan could act as a deterrent. Yet several species that occur abundantly in Costa Rica have not been reported from adjacent Nicaragua, while a few species recorded from Greytown are as yet unknown in neighboring Costa Rica. A provisional explanation is that the above-mentioned Costa Rican birds are essentially foothill dwellers that invade the fringing lowlands for varying distances which apparently do not quite reach to Nicaragua. The Nicaraguan birds seem to be those that prefer more open habitats of the sort covering the Río Frío region but still not available in northeastern Costa Rica.

3. The heavily forested, very wet, far southwestern sector becomes ecologically transitional with drier western Panama at approximately the border between the two countries. A few species and forms that occur in the Golfo Dulce region are not known from nearby Panama, while several Panamanian species are not recorded just a few miles away in Costa Rica. Several open-country species of Chiriquí Province will surely spread to Costa Rica as the forests are destroyed, but it is unlikely that forest species will find their way in the opposite direction. The majority of the species, however, are jointly present in the area.

4. The very humid southeastern corner and adjacent Panama, known as the Sixaola region, present a situation analogous to but more strongly marked than the one in the northeast. Here several Central American species barely extend southward into Panama; several South American species barely enter Costa Rica from Panama. Several other Central American and South American species, respectively, almost but not quite reach into Panama or Costa Rica. While the Río Sixaola does not appear to be a barrier, the Talamanca Range does approach the coast, and its foothills nearly disappear into the Caribbean Sea.

Whereas the highland core that comprises so much of Costa Rica and western Panama

was isolated by a seaway across the Nicaraguan "break" and by another across central Panama, the lowlands, rather than being merely interrupted, evidently became part of the continental shelf. On reappearance they provided a path for reinvasion by birds from the north and from the south. Very few species are endemic to southern Caribbean Central America at low elevations. A corollary is that the highland birds, even those of the subtropical belt, adapted to cooler, more rigorous climatic conditions, apparently did not

descend successfully into the tropical belt when confronted by the competition of lowland birds living under more amenable and presumably more desirable conditions. Today the physiographic dissection of the constricted coastal plain in the Sixaola region probably acts as a partial barrier between certain ecologically similar species which now overlap slightly but may be displacing one another northward or southward. The effectiveness of this barrier should not, however, be overrated.

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SPECIES ACCOUNTS

THE SEQUENCE OF FAMILIES follows Wetmore (1960); the sequence of species is that of Eisenmann (1955). The account of a species not represented by a specimen or other tangible evidence is enclosed in brackets. The original description of a form that is not listed in the standard catalogues, Cory *et alii* (1918–1949), Peters (1931–1962), and Ridgway (1901–1950), or the check lists, American Ornithologists' Union (1957), Friedmann *et alii* (1950), and Miller *et alii* (1957), is indicated in the text and the citation is given in full in the References. For the families Cotingidae, Pipridae, and Tyrannidae, I have consulted the late John T. Zimmer's unpublished manuscripts for Peters' "Check-list of birds of the world," in the American Museum of Natural History. Unpublished range extensions northward into Honduras of 15 species and forms are based on verbal in-

formation from Thomas R. Howell and Burt L. Monroe, Jr. The names of the institutions abbreviated in the text follow:

A.M.N.H., the American Museum of Natural History
B.M., British Museum (Natural History), London
C.N.H.M., Chicago Natural History Museum
L.A.C.M., Los Angeles County Museum
M.C., Moore Collection, Moore Laboratory of Zoology, Occidental College, Los Angeles, California
M.C.Z., Museum of Comparative Zoölogy at Harvard College
M.N.C.R., Museo Nacional de Costa Rica
M.N.H.N., Muséum National d'Histoire Naturelle, Paris
U.F.C., University of Florida collections
U.M.M.Z., University of Michigan Museum of Zoology
U.S.N.M., United States National Museum, Smithsonian Institution

NONPASSERINES

FAMILY TINAMIDAE

Tinamus major (Gmelin)

GREAT TINAMOU

RANGE: Southern Mexico to Bolivia and Mato Grosso.

Tinamus major fuscipennis Salvadori

RANGE: Caribbean slope, Nicaragua to central Panama.

Tinamus major castaneiceps Salvadori

RANGE: Southwestern Costa Rica to eastern Panama.

The Great Tinamou is distributed through the humid life zones on both slopes, from the lowlands to at least the middle of the subtropical belt, thus overlapping vertically the range of *Nothocercus bonapartei*. It has not been recorded from the central plateau and seems to be quite absent from the dry-forested Pacific northwest, which Carriker included in its range (1910, p. 376). The widespread Caribbean race, *fuscipennis*, reaches to the Pacific face of the Guanacaste Cordillera at subtropical elevations; it is not reported from the Cordillera de Tilarán. The

well-marked Pacific race, *castaneiceps*, is confined to the southwest.

The species keeps to the floor in mature forest, but it occurs also in shaded second growth, at woodland edges, and rarely in clearings with dense ground cover of the sort frequented by *Crypturellus soui*. Individuals apparently inhabit a home range, at least part of the year. Hunted relentlessly for its fine flesh and large eggs, the species manages to maintain itself in relative abundance compared to the large guans. It survives the firearms of the hunters but not the axe of the agriculturists.

It is encountered singly, for the most part, also in two's and sometimes in three's, but not in parties like quail. A terrestrial bird, it feeds and nests on the ground; I never saw it perched. It flies only when surprised or fearful of imminent danger; usually it simply walks away. This large bird is almost impossible to see unless come upon by accident. Occasionally met at the bend of a forest trail, it quickly melts into the undergrowth, yet sometimes walks well ahead in open view. The usual experience for the strolling observer is to be startled by a concealed bird bursting

pheasant-like into headlong reckless flight. Disappearing amid the trees, it can often be heard to land with a considerable amount of crashing not very far off. It is even more disconcerting when, having stopped to rest or take stock of his surroundings, he is again taken unawares by the delayed reaction of a bird that unexpectedly explodes upward with frantically beating wings and a whistled, frightened "woo hoo hoo." Now he is totally unprepared for a companion bird which, exploding, whirring, and whistling out of the very spot from which he has just looked away, noisily alights somewhere in the middle distance, heard but not viewed, in support of its reputation for secretiveness. The mannerisms of fright and flight, however, are typical, and the observer will at least know the identity of what he has not properly seen. On occasion I have even seen this tinamou, powered by its large breast muscles, rise straight into the air. An adult bird accompanied by chicks performs a distraction display in which it runs about with raised wings, lowered head, and extended neck.

The melancholy call of this tinamou has been described deservedly as one of the impressionably beautiful sounds of the tropical forest. The doleful cadences usually consist of three sets of paired tremolos. It is heard most often at morning and evening twilight.

Nothocercus bonapartei (Gray)

BONAPARTE'S TINAMOU

RANGE: Costa Rica to Ecuador and Venezuela.

Nothocercus bonapartei frantzii (Lawrence)

RANGE: Costa Rica and western Panama.

Bonaparte's Tinamou is known almost exclusively from the central highlands, also from a single locality on the Talamanca Cordillera, along which it undoubtedly occurs continuously on both slopes to Panama; there is no report from the northwestern divide. Vertically it ranges from about the middle of the subtropical belt through the lower montane belt and possibly higher. Carriker wrote (1910, pp. 377-378): "It is confined exclusively to the highlands and high mountains, seldom ever being seen below an altitude of 5,000 feet. They keep to the heavy forests, while their habits are essentially the

same as those of *Tinamus*. At Ujurrás, September 12, a bird was seen with four or five very small chicks, which it would not desert, but kept running and fluttering about in a circle in its endeavors to lure me away from its young. The chicks hid immediately and after the parent bird was secured not one could be found although diligent search was made. Upon dissection the old bird proved to be a male."

The highland counterpart of the Great Tinamou in appearance, behavior, and habitat, it is terrestrial, solitary, and wary. In my experience it is rarely met. I do not know its call, but I heard from a bird startled into flight a resonant, galline, cackling "wuk wuk wuk wuk."

Crypturellus soui (Hermann)

LITTLE TINAMOU

RANGE: Southern Mexico to Bolivia and southern Brazil.

Crypturellus soui modestus (Cabanis)

RANGE: Costa Rica and western Chiriquí Province, Panama, along the southern slopes of Chiriquí Volcano (Wetmore, 1963a).

The Little, or Pileated, Tinamou is easily the most abundant member of its family in the country. It is distributed along the humid portions of both slopes, from the lowlands well into the cool subtropical belt along all the interior highlands. If not a straggler, it seems to be virtually absent from the central plateau. Nor is it known from the relatively dry lowlands north of the lower Tempisque basin, yet it is common at upper tropical and lower subtropical elevations along the slope of the neighboring continental divide.

Primarily an inhabitant of shaded, dense second growth, including overgrown woodland borders, tall thickets, abandoned plantations, and shrubby-lined waysides, it occasionally enters the shadows of a mature cacao plantation or even a grassy trail open to sunlight. It occurs rarely in the forest and then only at breaks and other openings crowded with dense low secondary growth. A terrestrial bird, as a rule very wary, not readily taking to flight but preferring to walk away when disturbed, it is met singly as well as in two's and three's. The bobbing small head, rather short neck, and apparent tailless-

ness in combination suggest a terrestrial dove.

Though heard from all sides, the bird is difficult to see in the dense cover. Its usual call consists of several mournful tremulous whistles consecutively higher pitched; a single phrase can be confused with the heavier one of the Great Tinamou. Another call which, though common, I attribute to this species rather than an antbird on the basis of widely repeated circumstantial evidence, is a sequence of a half dozen or so whistled short notes rising right up the scale. I compare the pattern if not quite the quality to that of liquid emptying from a milk bottle held upside down.

***Crypturellus boucardi* (Sclater)**

BOUCARD'S TINAMOU

RANGE: Southern Mexico to Costa Rica; Colombia (?).

***Crypturellus boucardi costaricensis*
(Dwight and Griscom)**

RANGE: Honduras to Costa Rica.

Boucard's Tinamou is known in Costa Rica almost exclusively from the northern half or two-thirds of the Caribbean side of the country. From my own observations and other reports, it does not occur south of the latitude of Puerto Limón. It is present along the western slope of the Guanacaste Cordillera, onto which it spills through gaps; there is no report from the Cordillera de Tilarán. Carriker (1910, p. 382) stated that it ranges over the Pacific lowlands "from Nicaragua down as far as Pózo Azul de Pirrís (at least)," but I do not know on what evidence he based the claim. The species is common, at least locally, in the tropical-belt portion of its range. As it is not rare in the lower subtropical belt along the Guanacaste Cordillera, I assume that it also occurs above the tropical belt along the northern and eastern sides of the central highlands.

Like the Great Tinamou, it is a true forest bird that may enter contiguous advanced second growth, sometimes even thickets. In forest it seems to be more common toward the periphery than in the unbroken interior. It is, of course, terrestrial, and I have encountered it only singly. Compared with its more abundant, much larger neighbor (*Tinamus*), it frequents denser portions of the

understory, seems to avoid trails, is even more secretive and shy (except when calling), and does not explode into flight. Though the bird is seen rarely, its distinctive cry, heard many times daily through much of the year in favorable localities, proves it to be rather common. Moreover, the cry can be traced to the bird, which continues to call if the observer be sufficiently cautious. This it generally does from a stationary position, either on the ground or, perhaps preferentially, a foot or two above it, as on a fallen trunk.

The call usually sounds like a hollow, dull, two-part "awwww-wawwww" lasting two to three seconds, with the second part slightly rising; sometimes it has two breaks, at other times none. Given repeatedly at more or less regular 20- to 45-second intervals, it could belong to a terrestrial pigeon (*Leptotila*), but the catch in the middle distinguishes it. Standing at attention, the bird blows out its throat, on which the white becomes very apparent, lifts its head, then gives its neck an added stretch. At this moment the bird, as though regurgitating, commences the call. A pellet of air, so to speak, is seen traveling up to the chin, followed by a flattening of the throat so that the white mostly disappears and a horizontal crease is formed at the juncture of chin and throat, the latter now pushing in and out as if it were being cleared or moistened. Like an involuntary spasm the cry seems to be controlling the bird instead of the other way round.

***Crypturellus cinnamomeus* (Lesson)**

RUFESCENT TINAMOU

RANGE: Mexico to Costa Rica; Colombia and Venezuela.

***Crypturellus cinnamomeus praepes*
(Bangs and Peters)**

RANGE: Costa Rica.

The distribution of this species in Central America conforms to that of the arid Pacific avifauna, the southern limit of which is northwestern, Pacific Costa Rica. Here it ranges in the Tropical Dry Forest from the lowlands around the Gulf of Nicoya to, probably in greater numbers, the base of the Guanacaste Cordillera, especially from Miravalles to Rincón de la Vieja volcanoes; it is almost surely present, too, along the lower slopes of

the Cordillera de Tilarán. It rises toward but does not reach the central plateau. Scattered through the subhumid ranch lands, it dwells mostly in thickety stands, forested patches, and scrub-choked ravines. It seldom leaves cover for the open, as does its terrestrial neighbor, the bobwhite *Colinus leucopogon*, but occasionally it ventures onto cattle avenues that pass through low woodland. At the Cordillera, however, it is found in tall humid forest to elevations well up in the subtropical belt.

The Rufescent's often-heard, monotoned note proves it to be one of the common birds of its range. It can be seen not uncommonly, usually alone, walking along a trail, sometimes moving about inside cover. It occurs also in two's and family-sized small groups, the quail-like gregariousness of which seems to be unique among Costa Rican tinamous. In addition to chance encounters it can be located, especially during the dry season, by the sound of dry leaves crackling under the feet of noisily rummaging birds. If made apprehensive, they may continue their operations stealthily or simply walk away with a certain amount of leaf-crunching carelessness, perhaps foraging as they do so. Sometimes a bird or two is seen crossing a scorched patch of ground. If disturbed in such an open situation, it may merely increase the speed of its steps, which the bobbing of its head matches in time, or it may take off like a noisy rocket.

A minor "hoo" seems to be its only cry. Ventriloquial and far-carrying, it may be given almost all day long. Although musical, at close range it possesses a steam-whistle quality. At a little distance, as usually heard, except for a heaviness associated with large ground birds, it is not unlike a note of the manakin *Chiroxiphia linearis*, one of its neighbors throughout its Costa Rican range.

FAMILY PODICIPEDIDAE

Podiceps dominicus (Linnaeus)

LEAST GREBE

RANGE: Southern Texas to Tierra del Fuego; Bahamas and Greater Antilles.

Podiceps dominicus brachypterus (Chapman)

RANGE: Southern Texas to Panama.

The Least Grebe is widely distributed in the

middle altitudes, especially the subtropical belt on the Caribbean versant of the central highlands, the central plateau region, and the northwestern divide; it is also known from the Dota region. It is rare or extremely local in the Caribbean lowlands, present in small numbers at the head of the Gulf of Nicoya, and scattered elsewhere on the Pacific side. Preferring calm open water to swift streams, it occurs in marshes, ponds, lakes, temporary lagoons, or even water-filled dips. Several individuals are usually found together; the bird is seldom seen alone.

This little grebe is almost never observed out of the water. In open water it swims smoothly without nodding; where dense with plants it pumps its neck as if to compensate for the harder pedaling. Its head and neck, when carried high, are almost as tall as the short squat body is long, and often its wings lie shieldlike, in fanciful resemblance to the sails of an argonaut, above the fluffy rump. When carried low, its head rests atop the back, into which the neck has disappeared, and its breast bulges out in front. A confirmed diver, the bird obtains most of its food under water. It also stretches its neck to pluck items from floating plants, or swims with its neck extended and its beak skimming just below the surface.

It flies very seldom, and then not far, with strenuous rapid beats and hanging body, before dropping with a splash and a little glide. Sometimes a bird beats and flutters along the surface for a few feet, working up momentum for the smooth glide which follows, apparently only when a companion is close by. Frequently it leans to one side in order to scratch, when its lobed toes can be observed, or it may rise almost out of the water to beat its wings and shake its body, revealing the silvery white under parts. Like a seesawing mechanical toy, it may dip its head to shower itself with drops, accompanied by feather-fluffing shrugs and a rocking of the rump. Pushing with its breast it occasionally clambers onto a clump or pad, where it rests on its chest or sits upright. Its yellow eye at all times looks stern. Many other light-eyed birds also have a "not-to-be-trifled-with" look. In this case it applies to a little bird of which the ridiculously short wings and apparent lack of tail leave its rear end uncovered.

Its usual call is a kind of watery churr or shushing whinny, very similar to that of the crane *Laterallus albigularis* or the spine-tail *Synallaxis brachyura*. Another call varies from a loud, gooselike honk to the reedy little honk of a toy horn. Another note is a reedy "yet" or "ret." From subadults I have heard thin, quavering, rather prolonged "peep" 's.

Podilymbus podiceps (Linnaeus)

PIED-BILLED GREBE

RANGE: Canada to southern Argentina; West Indies.

Podilymbus podiceps podiceps (Linnaeus)

RANGE: Breeds in North America; winters to Panama.

[**Podilymbus podiceps** subspecies?]

The Pied-billed Grebe breeds in most of the New World; northern birds winter southward to Panama. In Costa Rica it is very uncommon and local, and the only known specimen is immature. Nevertheless, the species here consists undoubtedly of a migrant and a resident form. The migrants are dull and unpatterned; the native birds are bright the year round. Either form can be expected almost anywhere, from the lowlands to the central highlands, but the species is absent far more often than present even in apparently suitable surroundings. Larger bodies of still water, usually with floating vegetation or with reedy margins, are preferred, never the oversized puddles sometimes favored by the little Least. For the most part, however, the habitats of these two grebes are identical.

The species occurs singly (migrants and residents) or in mated pairs with young (residents). On a protected pond I have seen the brightly marked native birds build their floating nests, delivering nesting material by diving beneath obstructing vegetation and dragging lily pads by their stems. The voice (perhaps not used by migrants) is somewhat variable. The most common call, a long "koo koo kuk kukukukuk kuk, kuk, kuk," rising in pitch, accelerating, and staggering to a halt, is characterized by the succession of "k" consonants; the head is thrown up and the mouth opened wide at each note. A not dissimilar call, a honking "kook, kook, kook,"

and so on, might suggest the Least Grebe's protracted churr, but it is slower, heavier, and reedy or nasal. The bird also utters a throaty "oo-úk."

FAMILY PROCELLARIIDAE

Puffinus pacificus (Gmelin)

WEDGE-TAILED SHEARWATER

RANGE: Indian and Pacific oceans.

Puffinus pacificus chlororhynchus Lesson

RANGE: Breeds on islands in Pacific Ocean, including Revilla Gigedo; ranges over Indian and Pacific oceans.

There are to my knowledge three Costa Rican specimens of the Wedge-tailed Shearwater (A.M.N.H. Nos. 325746, 325747, 325748). These were reported in error as *P. puffinus* by Murphy (1952, p. 20), who later corrected the misidentification on the specimens. The birds were collected the same day, February 8, 1938, 20 miles south of Cabo Blanco, at the southern tip of the Nicoya Peninsula, by the Eastern Pacific Zaca Expedition of the Department of Tropical Research of the New York Zoological Society. Probably the species appears regularly off the Pacific coast.

[**Puffinus griseus** (Gmelin)]

SOOTY SHEARWATER

RANGE: Breeds in South Pacific, off southern Chile, and Falkland Islands; ranges north to North Pacific and North Atlantic oceans.

The only published Costa Rican report is that of Austin Smith (1932): "On May 18, 1932, while aboard a small launch, sixty miles South of Puntarenas; and about three miles off shore, a Sooty Shearwater alighted on the water ahead of the launch; on being flushed, it again settled near the side of the boat, permitting a close examination. A few weeks later, so the captain of the launch reported, a bird of the same species came aboard one night, in nearly the same latitude." This shearwater is almost surely a regular seasonal migrant off both coasts. Because it may be closely similar in appearance to at least one other species (*P. tenuirostris*), I prefer, in lieu of a specimen, to keep it on the list of probables.]

***Puffinus lherminieri* Lesson**

AUDUBON'S SHEARWATER

RANGE: Breeds on islands in pantropical seas.

***Puffinus lherminieri subalaris* Ridgway**

RANGE: Breeds in Galapagos Archipelago, recorded off Panama and Costa Rica.

[*Puffinus lherminieri lherminieri* Lesson

RANGE: Breeds in West Indies, particularly Lesser Antilles; ranges to north coast of South America and southeastern and Gulf coasts of the United States.]

[*Puffinus lherminieri loyemilleri* Wetmore

RANGE: Breeds at Tiger Cays, Bocas del Toro Province, Panama.]

The only Costa Rican specimen of Audubon's Shearwater is a male (A.M.N.H. No. 325749) belonging to the Galapagos race, *subalaris*. It was collected February 8, 1938, 20 miles south of Cabo Blanco, by the Eastern Pacific Zaca Expedition of the New York Zoological Society.

In mid-August, 1953, a few miles off the east coast of Costa Rica, I saw several individuals that were almost unquestionably a Caribbean form, either the West Indian *lherminieri* or the recently described, Panamanian *loyemilleri* (Wetmore, 1959a). The birds occurred singly, floating on the sea or flying close to the surface. The flight was of the foraging type, that is, a few flaps followed by wheeling glides in which one wing tip of the tilted body almost touched the water. When sailing, the bowed wings formed an evenly curved arc. The birds showed no interest in the ship.

[*Pterodroma hasitata* (Kuhl)

BLACK-CAPPED PETREL

RANGE: Breeds in West Indies; ranges to United States and Brazil.

On August 14, 1953, within sight of the northern Caribbean coast of Costa Rica, I observed a petrel that could hardly have been other than this brightly patterned species. The bird was not attracted by the ship. Flying close to the surface, alternately flapping a few times and sailing either a long or a short distance, it followed an irregular path. The

species no longer seems to be excessively rare. At any rate, I saw two individuals in early April, 1961, in the eastern Caribbean Sea.]

***Pterodroma phaeopygia* (Salvin)**

DARK-RUMPED PETREL

RANGE: Breeds at Hawaiian Islands and Galapagos Archipelago, the latter population recorded ranging to Clipperton Island and northern Peru.

Owing to the kindness of Mr. Eugene Eisenmann, who passed on to me the following data contained in a recent letter to him by Raymond Lévêque, this notice of the presence in the Paris Museum of apparently the only Costa Rican example of Dark-rumped Petrel (M.N.H.N. No. C.G. 1936 no. 2) appears in print. An (adult?) female with primaries in molt, its allocation is almost certainly with nominate *phaeopygia* of the tropical eastern Pacific Ocean rather than with *sandwichensis* of the Hawaiian Islands. The specimen was collected March 26, 1935, by the Expédition de l'Île de Pâques at latitude 9° 15' N., longitude 85° 24' W., some 29 miles southwest of Cabo Blanco (the southern tip of the Nicoya Peninsula). No doubt this petrel, as do unquestionably a number of as yet unrecorded kinds, occurs seasonally in Costa Rican waters.

FAMILY HYDROBATIDAE

[*Oceanites oceanicus* (Kuhl)

WILSON'S PETREL

RANGE: Breeds on islands off southern South America to shores of Antarctica; ranges over South Pacific and Indian oceans and to North Atlantic Ocean.

Several times in mid-August, 1953, while at sea off the Caribbean coast of Costa Rica, I saw small petrels that had the martin-like flight of Wilson's and appeared to have the style of plumage of that species. They did not follow the ship. These birds probably belonged to the race *oceanicus*. In the literature I find the species had been previously observed July 9, 1911, at latitude 10° N., longitude 86° W., in the eastern Pacific Ocean close to the Nicoya Peninsula, by a Captain Paessler (1913, p. 42). This report probably applies to the race *chilensis*. I place the species on the hypothetical list.]

FAMILY **PHAETHONTIDAE****Phaethon aethereus** Linnaeus

RED-BILLED TROPICBIRD

RANGE: Tropical and subtropical seas.

Phaethon aethereus mesonatus Peters

RANGE: Subtropical and tropical North Atlantic Ocean, Caribbean Sea, and eastern Pacific Ocean.

There are two known Costa Rican specimens, and both were collected on the Pacific side of the country. The first was taken by Enrique Arcé in the month of March in the Gulf of Nicoya and was reported in print a few years later by Salvin (1870, p. 116). The second specimen (A.M.N.H. No. 389140) was taken December 5, 1903, by Austin Smith at El Pozo (altitude 25 feet) in the lower Térraba Valley.

Recently I have been informed (*in litt.*) by David W. Waller, a member of a scientific party from the Bureau of Commercial Fisheries Biological Laboratory, San Diego, California, aboard the M/V "Red Rooster," of three sight identifications in 1963. These are dated April 18, May 6, and May 7, and all were made in the vicinity of Cabo Velas on the northwest Pacific coast of Costa Rica.

Probably the species occurs off the Caribbean coast, at least occasionally, as it breeds nearby at Almirante Bay, Bocas del Toro Province, Panama.

FAMILY **PELECANIDAE****Pelecanus occidentalis** Linnaeus

BROWN PELICAN

RANGE: Pacific and Atlantic coasts from British Columbia and North Carolina to Tierra del Fuego and Brazil.

Pelecanus occidentalis carolinensis Gmelin

RANGE: Coasts of southeastern United States to Colombia and Venezuela, West Indies, and Pacific coast of Central America.

The Brown Pelican is distributed rather commonly along both coasts, far more abundantly on the Pacific than the Caribbean. Groups are often seen flying in single file, but only along the Pacific shore have I seen flock after flock, all moving in a northerly direction both in spring and fall. Little

or nothing is known about its status, whether resident or seasonal, though the species is met the year round. As there are no breeding data for Costa Rica, I mention two females with greatly enlarged ovaries that I collected the first week of October, 1951, on the Pacific coast.

The flocks number from several to 50 or more birds flying in V formation, either arm of which is a little longer or very much longer than the other. In general, the great majority are immature-plumaged, but the flock is usually led by a single adult, sometimes two or three, at the apex. In one passing flock the lone adult bird was the third in line, then lagged to last place in the same arm of the V, then, swinging to the lead, headed the flock off in a different direction. I have also seen more or less evenly mixed flocks of immatures and adults, but these I noted seldom. The V's often break up in confusion over a river mouth. This happens also in migrating gulls, but the latter, unlike the pelicans, spiral upward and reform their ranks high in the sky. Especially along mangrove-lined estuaries parallel with the Pacific shore have I seen groups of pelicans sitting about, high in tall trees.

Birds in follow-the-leader line often sail steadily on bowed wings, so low that the tips nearly scrape the water. When the birds flap, their bodies rise the sufficient bit to permit the wing tips to clear the surface. The birds flap not in unison but in sequence as each passes over the same spot, as though it were a becalmed pocket amid the swells. The airborne bird, resembling a flying boat, seldom skirts the waves or sails with a sideways tilt, as does a booby. Only along the Caribbean coast did I happen to see this species dive. Usually it fishes afloat, as at a shallow river mouth when the tide is out, and adults and immatures often keep apart in groups of their own kind. Swimming birds hold their beaks nearly perpendicular and touching the water. A bird bobbing in the surf raises its wings at every incoming boil to avoid wetting; it habitually rides the surf landward, with its head depressed to the surface of the water. Afoot, its body is nearly horizontal, with neck stretched high and beak held vertical. Very short-legged, the bird has a very awkward walk.

FAMILY SULIDAE

Sula neboxii Milne-Edwards

BLUE-FOOTED BOOBY

RANGE: Mexico to Peru and Galapagos Islands.

Sula neboxii neboxii Milne-Edwards

RANGE: Pacific coast, Mexico to Peru.

There seem to be only two reports, both by Sassi (1938, p. 287) on the Pacific coast. One is of a specimen collected in July on a little island at the peninsular side of the entrance to the Gulf of Nicoya. The other is a sight record in March on the Golfo Dulce near Puerto Jiménez.

[Sula dactylatra Lesson

MASKED BOOBY

RANGE: Tropical and subtropical Pacific, Indian, and Atlantic oceans.

While approaching Puerto Limón on August 14, 1953, I saw a few of these large white boobies flying ahead of the ship toward nearby Isla Uvita. This unmistakably patterned species cannot be confused with the still unrecorded *Sula sula* (merely listed by Zeledón [1887]), which I had been seeing regularly farther north in the Caribbean Sea. I know of no other Costa Rican report.]

Sula leucogaster (Boddaert)

BROWN BOOBY

RANGE: Pantropical seas.

Sula leucogaster leucogaster (Boddaert)

RANGE: Caribbean Sea and tropical Atlantic Ocean, ranging in New World north to Bermuda, Florida, and Texas and south to southern Brazil; recorded in Argentina.

Sula leucogaster etesiaca Thayer and Bangs

RANGE: Pacific coast, southern Central America to Ecuador.

This, the common booby of the country, is the only one that is normally encountered: the race *leucogaster* along most of the Caribbean coast, *etsiaca* the length of the Pacific coast, including the islands in the Gulf of Nicoya. The species evidently breeds on rocky islets off both coasts (Carriker, 1910, pp. 439-440) and makes extensive foraging trips daily. Occurring singly or in small

strung-out groups, it does not approach the shore closer than the outermost breakers.

In outline the symmetrically tapered extremities of the bird are pointed at the tip of the beak, tail, and wings. The wings cross the middle of the body at right angles. The spiky tail is wedge-shaped even when spread. At a little distance the legs are not noticeable. The white swath along the under wing is like that in albatrosses and shearwaters. Sailing low between billows on evenly bowed wings, their ends below body level, the tilting bird often touches the water with one wing tip; or, the bird may suddenly deflect downward and sideways from the line of flight. Thus it behaves as a shearwater in the almost total absence of the latter from Costa Rican coastal waters, except it does dive frequently from the air. Also, I have seen the floating bird dabble while clumsily waving its wings. Together with frigatebirds, a number of these boobies join the commotion caused by a school of porpoises observable a mile out. The frigatebirds swoop to and from the surface, the boobies wheel and dive.

FAMILY PHALACROCORACIDAE

Phalacrocorax olivaceus (Humboldt)

OLIVACEOUS CORMORANT

RANGE: Southern United States to Tierra del Fuego; Cuba and Bahamas.

Phalacrocorax olivaceus olivaceus (Humboldt)

RANGE: Nicaragua to Tierra del Fuego.

The Olivaceous Cormorant may occur almost anywhere under suitable conditions, from both coasts to the subtropical belt, but mostly at low elevations. It is fairly common along the coasts, plentiful in the Río Frío region, and forms large flocks in the flooded lowlands at the head of the Gulf of Nicoya. Elsewhere it frequents the larger rivers, especially the boulder-strewn Reventazón, which it travels as highways, and it regularly visits bodies of calm water inland. As noted by Carriker (1910, p. 438): "The birds frequenting the Caribbean slope evidently breed on some island in the Caribbean not far distant from Costa Rica, and spend the time after the breeding season in the rivers inland. They are usually to be seen standing on a rock in the riffles, watching for fish, and can be seen by the hundreds in the Reventazón River

alongside the railway to San José." I found it nesting in the Río Frío region, and it probably breeds elsewhere on the mainland.

One seldom sees fully black adults, even fewer with white ear tufts. Plumage stages include brownish-backed individuals, with face, throat, and breast almost white on young birds, somewhat older ones with drab under parts, and largely blackish brown sub-adults with pale throats. The well-advanced nestling is black, with white forehead and white under side of beak and chin separated by black across the face. Any cormorant seen can be assigned automatically to this species, the only one in the country.

The food of this cormorant seems to consist principally of small fishes, for which the swimming bird dives from the surface and which it pursues under water. I have not seen it dive from a height. In open water, many individuals may congregate in ducklike rafts. Where trees line the shores, the birds are generally seen perched in the daytime, occasionally roosting at dusk. Along the larger river valleys, they stand on gravelly flats or sit about individually on favorite boulders streaked white with droppings. A bird may fly out over the open ocean, but I have seen it enter the water only well inside the breakers.

A swimming bird that wishes to fly requires a long take-off. Skimming the surface, the bird usually but not necessarily paddles its tail during the sustained effort to rise. From a perch, despite the strong beating of its wings, the bird sinks and almost touches the water before passing into smoother, higher flight. Often a bird flies round and round a pond, apparently for the sake of the exercise. In flight, only the cormorant has the long axis of the body, stiff from beak to tail, tilted upward; this mannerism should distinguish it over the ocean from a booby. A crook in the neck and short glides between series of beats should separate it from ducks, which it resembles in silhouette though it lacks their streamlining.

The cormorant is commonly seen perched with its wings spread to dry. Short-legged and angle-winged, the bird may breathe rapidly with partly opened beak and bare throat, panting in a reptilian manner. Its small, "fishy" blue eye, protruding as from a

buried stalk, has a lidless "bilious" stare. Swimming, the bird lies low, sometimes with only head and neck exposed, like a grebe or anhinga. Its hooked beak, slanting upward, distinguishes it from any other swimming bird in the country. Standing or perched, its erect carriage is similar to that of an anhinga. Its only note is a piglike bass grunt, which accounts for one of its names, "pato chancho" (pig duck).

FAMILY ANHINGIDAE

Anhinga anhinga (Linnaeus)

ANHINGA

RANGE: Southeastern United States through Central and South America east of the Andes to northern Argentina; Cuba.

Anhinga anhinga leucogaster (Vieillot)

RANGE: Southeastern United States to Colombia; Cuba.

Despite few Costa Rican records the Anhinga is locally abundant. It occurs mostly in the northwestern Pacific lowlands, especially the Tempisque basin and locally to the base of the Guanacaste Cordillera, and it is again plentiful in the Río Frío region. In addition, it is resident on Lake Arenal at 2000 feet above sea level in the northwestern divide. A recent sight report by R. Ryan and N. Boyajian of a bird in flight at the Río Coto Brus is the only record for all the southern half of the Pacific slope, though the species is likely to be present at the Térraba delta and the swampy Río Sierpe. With the exception of the Río Frío, it is scarce on the Caribbean side, though it may perhaps be common in the poorly known coastal marshes and lagoons northward from Puerto Limón; there is no report from the southeast.

Where the Anhinga does occur it is to be found along the lower courses of slow-moving rivers, whether forest-bordered or not, and at mangrove-lined lagoons and estuaries. It may be present, too, at good-sized bodies of still water, such as grass-covered Lake Arenal, where it frequents the open channels that cut through the floating vegetation and perches in sunlight, completely exposed to view. This ungainly bird, often with wings half spread, generally sits or stands only a short distance above the water. Climbing a dead-branched

tree, it comes to rest with outstretched neck and a gooselike nodding. It dives not to spear prey but to swim about. Swimming, the bird may be partly or completely submerged but for its snakelike head and neck. Sinking or diving from the surface, it hunts under water. In flight, this long- and broad-tailed, extremely slender-necked bird alternates a number of flaps and short sails, its tail twisting with the beats. An accomplished soarer, it sails about high in the air, like a vulture or stork. The only sound I heard was a low, throaty, somewhat scratchy, not quite hissing long note given by a disturbed bird.

FAMILY FREGATIDAE

Fregata magnificens Mathews

MAGNIFICENT FRIGATEBIRD

RANGE: Warmer portions of eastern Pacific and Atlantic oceans, including Caribbean Sea; ranges in New World to California, southeastern United States, and Argentina.

Soaring frigatebirds can be seen commonly along both coasts, especially at ports, and also out at sea. The species is particularly abundant along the shores of the Gulf of Nicoya. The likelihood that it crosses the country is small, but individuals occasionally pass over the Nicoya and Osa peninsulas. Perched birds are seldom encountered except at certain favored localities, usually at estuaries and lagoons parallel with and close to the seashore. The only Costa Rican breeding report seems to be that of Milton (1962, p. 3), at the southern tip of the Nicoya Peninsula: "A little over a mile due south of the Cape [Cabo Blanco] lies Isla Cabo Blanco [Isla Blanca], a great, steep-walled rock approximately 500 meters long and 150 meters wide. During the dry season the rock turns bright white due to the collected guano from a very large rookery of magnificent frigatebirds The colony visible at midday was well over 500, and the total population may well be over 1000."

One of the most aerial of birds, circling lazily on motionless wings or gliding effortlessly for miles at times in a straight line, the species usually makes no detectable adjustment to air currents. Wheeling, it often exhibits a mannerism apparently unique to frigatebirds of pivoting in a tight arc around one wing tip. Its long deep regular beats are leisurely graceful, and its body neither rises

nor falls from the line of flight. Attracted to a floating object or worrying another bird, it is capable of making an impetuous swoop or sideslip fraught with "dragon"-like menace in the angles and points of its great black wings and the shearings of its long, double-pronged tail.

I have not seen the frigatebird light on water. In a closed situation, such as a tree-lined cove, it may try several sweeps from different directions before successfully snatching an object from the surface. Apparently the bird cannot without great difficulty take to the air from a flat substrate. Its extremely short legs, next to useless for walking, are used only for perching. A lofty, bare thin branch from which it can sail into unobstructed flight is usually favored, although once I found a bird much lower, inside tangled mangroves. Often unable to settle on the perch at the first attempt, especially when occupied by other individuals, it may make several approaches before coming to rest and comfortably folding its very long wings into place. The silent birds sit almost perpendicular, with pointed extremities of tapered wings and tail forkedly crisscrossed at conflicting tangents.

FAMILY ARDEIDAE

Ardea herodias Linnaeus

GREAT BLUE HERON

RANGE: Breeds in North America south to southern Mexico, West Indies, and Galapagos Islands; winters to northern South America.

Ardea herodias herodias Linnaeus

RANGE: Breeds in North America; winters to northern South America and in Greater Antilles.

Ardea herodias lessonii Wagler

RANGE: Breeds in Mexico; winters to Costa Rica.

The Great Blue Heron, a migrant from the north, arrives about the beginning of September and is largely gone in April, although I have seen it early in May. Possibly a few individuals remain in the summer. Occurring on both slopes and across the central plateau, it is present in fair numbers only in flooded lowland Guanacaste, uncommonly almost

everywhere else. In the fall, individuals that are probably transient along the coasts can be seen standing a bit offshore in the ocean and well out on shallowly covered flats at low tide. The race *lessonii* is poorly differentiated from nominate *herodias*, which appears to be the common wintering bird.

For the most part the Great Blue frequents the same localities, mostly in flat open country, as do other slender-necked herons. Like the latter, an occasional individual is apt to occur along a river in woodland or in a swampy copse such as is sometimes visited by Wood Storks. The Great Blue differs from other open-country herons in its extreme wariness, usually keeping outside shotgun range or apprehensively flying off still farther. It is solitary in winter (several may occur together during migration), keeping well apart from its closest neighbors, again in contrast to the other species. Whereas the more common herons stay mostly on the ground in marshy country, the Great Blue spends a great deal of time standing on or near the tops of small trees, thus making an approach by the observer extremely difficult. Afoot, its pose is statuesque, and the bird generally remains inactive. Its flight is majestic as the unhurried deep strokes of its wings, with the spread of those of an eagle, carry it with a floating lightness. Its cry is a heavy, guttural "wuuuuuk" (one syllable), very deep, as befits the large size of the bird, but not so bass as that of the Great Egret (*Casmerodius*).

***Butorides virescens* (Linnaeus)**

GREEN HERON

RANGE: North and Middle America; winters to Colombia.

[*Butorides virescens virescens* (Linnaeus)]

RANGE: Breeds in central and eastern North America; winters from southern United States to Colombia and in West Indies; not recorded in Costa Rica.]

***Butorides virescens anthonyi* (Mearns)**

RANGE: Breeds in western United States and northwestern Mexico; winters to Costa Rica.

***Butorides virescens maculatus* (Boddaert)**

RANGE: West Indies and southeastern Mexico to central Panama.

Nearly all Costa Rican specimens of the Green Heron appear to belong to the resident Middle American population, *maculatus*. Sassi (1938, p. 292), however, doubted the validity of *maculatus*, as all but two of six birds taken by him during the breeding season in early April at the Golfo Dulce, and at the end of June near the head of the Gulf of Nicoya, fall completely within the size range of the migrant *virescens*. Wintering *virescens* has been presumed identifiable only on the basis of larger size than *maculatus*; there is no indisputable Costa Rican record. The presence of *anthonyi* seems confirmed by the very large size of a single specimen taken near San José and identified by Oberholser.

The species is widely distributed from sea level to at least 6000 feet in the central highlands, but it is most plentiful in the stream-abounding lowlands. Its preference for margins of watercourses, lagoons, and estuaries and for heavily foliated banks, in conjunction with its solitary nature, makes this heron appear far less numerous than the species which form bands in more open situations, yet it probably exceeds most of the others in total numbers. The Green Heron is more arboreal or, at any rate, displays a greater facility, perhaps most noticeable in mangroves, to move amid vegetation and branches than do the slender-necked herons. It rather resembles the bitterns in appearance, but its habits, particularly the one of perching on trees, are more like those of typical herons.

As the bird is usually startled by the observer or else is already aware of his presence, it is generally seen in a state of excitement evidenced by its flicking tail, outstretched neck, and raised crest. Nevertheless it may permit a close approach before taking flight for a moderate distance. It hardly ever wades when hunting. Instead it rests on a floating object, or stands in shallow water, or skulks along a shady margin. Foraging, the bird holds its body tilted a little forward and with the neck drawn back, neither extended nor S-curved as in many herons. During a short flight the neck is sometimes held outstretched; in longer flight it is always retracted into a ball-like mass, unlike the graceful recoil of other herons. The crest is usually not noticeable in flight, but it is always raised and the neck extended by a bird preparing to alight.

The usual note, a "kyock" or "chyowk,"

can be altered to an almost animal-like, somewhat explosive growl. Also uttered are a galline cackle and a heavy "chuk-uk-uk."

***Butorides striatus* (Linnaeus)**

STRIATED HERON

RANGE: Old World tropics; central Panama through South America; recorded in Lesser Antilles and Costa Rica.

***Butorides striatus striatus* (Linnaeus)**

RANGE: Central Panama to Peru and southern Brazil, also Trinidad and Lesser Antilles (?); recorded in Costa Rica.

The only Costa Rican specimen (A.M.N.H. No. 389135), a brownish-necked, adult-plumaged female, was collected April 14, 1923, by Austin Paul Smith at Las Cañas, Guanacaste. I find it inseparable from similar-plumaged individuals, described as *patens* by Griscom, in central Panama, which can in turn be matched by individuals among the peripheral populations of nominate *striatus* in northern South America, Brazil, and western Ecuador. The anomalous occurrence of the species in northwestern Costa Rica is unquestionably that of a wandering individual.

***Florida caerulea* (Linnaeus)**

LITTLE BLUE HERON

RANGE: Eastern United States to Peru and northern Argentina; West Indies.

The Costa Rican population apparently consists of relatively few residents augmented seasonally by many migrants from the north, when the Little Blue becomes one of the most common herons in the country. Still it may be far outnumbered in certain localities by concentrations of Snowy and Great Egrets. The more widely dispersed Little Blue, however, is seen more regularly. It is apt to occur almost anywhere, from either coast, where common, to the central plateau, where uncommon. As with most water birds, it is the lowlands that provide most of the suitable habitat. The species is more common at coastal lagoons, estuaries, and open-country channels than at swift streams. To a much greater extent than other herons, except the recently spreading Cattle Egret, it regularly

visits fields and pastures. It occurs also in the same places, including the offshore surf, as other open-country herons.

White immatures are everywhere more plentiful than adults. Occasionally one meets attractively intermediate-plumaged individuals with dark blotches symmetrically disposed over the white ground. The species is seen singly or in two's and three's along rivers and streams, on the ground, on branches, sometimes at the very tops of the trees. Both the adults and immatures may fly a good distance with the neck outstretched, in contrast to the other slender-necked herons. The wing beats are somewhat slower and deeper than those of the Snowy Egret, markedly slower than those of the Cattle Egret. Afoot, it shows little of the liveliness of the Snowy and none of the interest in livestock of the Cattle Egret. Lacking the elegance of the showy Snowy, its carriage is pleasing compared to the hunched Cattle Egret.

Its usual cry is a long harsh "kraaak," somewhat lighter and perhaps smoother than the similar one of the Snowy Egret. The bird also makes a short, squirrel-like bark not unlike the "chuck" of an oropendola.

***Casmerodius albus* (Linnaeus)**

GREAT EGRET

RANGE: Virtually cosmopolitan in warmer portions of the world.

***Casmerodius albus egretta* (Gmelin)**

RANGE: Eastern and southern United States to southern Argentina; West Indies.

As with other resident herons the breeding ranges of which extend northward into the temperate region, I suspect the Costa Rican population of the Great Egret is greatly increased by visitants. At any rate, the bird is seen much less often from May to September, when it is distinctly uncommon, than during the rest of the year. The species occurs over most of the country, more abundantly along the coasts than inland; it is rare or accidental in extensively forested regions. Though usually seen singly in most places, it is present in concentrations along slow-flowing lowland rivers and in swampy, flooded Guanacaste. Essentially an open-country heron, its habitat hardly differs from that of the Snowy Egret and the Little Blue and Great Blue Herons.

In Guanacaste it tends to associate more closely with the Wood and Jabiru Storks than with herons, noticeably at sites frequented by a number of species.

Standing nearly as tall as the Great Blue, it towers above the other kinds of herons. Except in flight, its neck, which is relatively longer than that of most of the smaller species, is seldom folded tightly or drawn into the breast. Its sharp kink undoubtedly triggers and recoils the sudden thrusts at prey; it springs back into place when straightened even in a dead bird. Habitually this heron poses "like Patience on a monument," in contrast to the active smaller species, even when hunting. But it also stalks with slow stealth, carefully lifting and placing its wading feet and carrying its jointedly flexed neck outstretched. Flight is buoyant and serene as the broad wings beat slowly and regularly. The black legs, extending straight and far beyond the short broad tail, counterbalance the long yellow beak that rests on the recurved neck. Its cry, a long deep croak similar to but deeper than that of most other herons, is a piglike "kaar" or "kruur."

***Egretta thula* (Molina)**

SNOWY EGRET

RANGE: Southern and western United States to Chile and northern Argentina; West Indies.

***Egretta thula thula* (Molina)**

RANGE: Southeastern United States to Chile and northern Argentina; West Indies.

In addition to the rather small resident population of the Snowy Egret, there is undoubtedly a seasonal influx of migrants from the north. A few visitants evidently remain in the summer, in view of the recovery here on July 8, 1933, of a bird banded in Texas on May 29, 1932 (Eisenmann, 1951, p. 183). The species is distributed along both slopes, from the seashore up to at least 2000 feet, possibly higher. On the Caribbean side, where it is generally uncommon, it seems to be a wanderer in the extensively forested areas; it is common only in the open Río Frío region. On the Pacific side it is common in the northwestern lowlands, especially the Guanacaste marshes and lagoons, and at river mouths and embayments elsewhere along the coastline.

It may occur in large groups, but only at especially favorable sites.

An active, striding heron, it obtains food by bending at the "knees," leaning forward, and darting the beak by straightening the neck. It may forage in this manner while walking on floating vegetation. It also enters the surf along the seashore. Despite its seemingly knock-kneed stance, it is more graceful than the similar-plumaged immature *Florida*, wears elegant yellow "gloves," and has a rather plumelike fluffiness to the feathering of the crown and neck. It utters a hoarse "kraa-aak," sometimes beginning with a short heavy squeal.

***Bubulcus ibis* (Linnaeus)**

CATTLE EGRET

RANGE: Warmer parts of Old World, local in New World.

***Bubulcus ibis ibis* (Linnaeus)**

RANGE: Iberian Peninsula, Africa, western Asia, northern South America, Middle America, eastern North America.

I first encountered this heron in December, 1954, in the lower Tempisque Valley, Guanacaste. I did not happen to meet it again until February, 1958, this time in the Sarapiquí lowlands. The Cattle Egret has since spread rapidly over most of the tropical belt, in some places to its upper limits, in open swampy country or wet pastures on both slopes. Apparently the species does equally well in the dry and humid life zones, provided cattle or other livestock be present. It almost surely breeds in Costa Rica, as birds with nuptial plumes are to be seen in May.

It is generally found in foraging groups of several to a dozen or so members, seldom alone, but it roosts in flock-sized aggregations. At the end of the day group after group may be observed flying past a given spot along a river, presumably bound for a communal roosting site. Interestingly, I found it roosting at one locality (the lower Río Barú) together with other white herons (Great and Snowy Egrets and immature Little Blues), each in a pure group separated from a neighboring group of one of the other species. Except that the bird is now said to mount the backs of cattle, which I have not

personally witnessed, its daily behavior in Costa Rica remains as I have described it (Slud, 1957a).

***Hydranassa tricolor* (Müller)**

LOUISIANA HERON

RANGE: Southern United States to Ecuador and Brazil; West Indies.

***Hydranassa tricolor ruficollis* (Gosse)**

RANGE: Southern United States to western Ecuador and Venezuela; West Indies.

Costa Rica undoubtedly forms part of the breeding range of the Louisiana Heron, despite the lack of nesting data for this as well as most other members of its order. Also, it is quite possible that migrants from the north go there to spend the winter. The species occurs from coast to coast across the central plateau, but in most places it is uncommon to rare or accidental. It is met fairly regularly along the Pacific coast at mangrove-lined estuaries and in the lagoons of lowland Guanacaste, and I found it rather common at the head of the Golfo Dulce. On the Caribbean side it is fairly common only in the Río Frío region. Like other long-necked, long-legged herons, it is essentially an open-country bird. Usually it is seen alone, well apart from its nearest neighbor, yet it is not so nervously wary as some other solitary species.

Standing some 18 inches tall, its size is that of the Snowy and Cattle Egrets and the Little Blue Heron, from which it differs even in silhouette because of its snakelike neck, head, and beak. Its neck, almost too long, as it were, for its body, is bent into two flattened curves that form a broad S. Its legs, bare of feathers in the "thigh" region and running straight up into the body, have the "knee" placed like a hinge in the middle. Searching for prey along marshy edges, the bird walks or wades quickly, half-crouched on bent legs, neck S-curved like that of a snake, its dark base wedged into the white abdomen, and wings flicking as though for balance. This slender-bodied heron is the only one in Costa Rica that regularly walks on floating plants, as does a gallinule or jaçana. Its slenderness is apparent also in flight, especially the snakiness of the head. The bird alights in plunging zigzag swoops as does a Solitary Sandpiper.

***Agamia agami* (Gmelin)**

AGAMI HERON

RANGE: Southern Mexico to Peru, Bolivia, and Brazil.

The Agami Heron is very uncommon at best. There seem to be only two past records. One is from Pozo Azul de Pirrís in the humid Pacific lowlands a little south from the entrance to the Gulf of Nicoya. The other is from "Laguna de Ochomogo between San José and Cartago [on the central plateau], which seems to be a very unusual occurrence for this species" (Carriker, 1910, p. 431). Probably it occurs elsewhere in the southwest, possibly at the Térraba delta and in the Golfo Dulce region, though there are no reports. It is almost surely present in much of the tropical belt on the Caribbean slope, though I met it there at only two localities, once at Laguna Grande in the eastern foothills of Turrialba Volcano, several times in the lowlands near Puerto Viejo de Sarapiquí. Except for the individual at Laguna Grande, which was on flat boulders in an open marshy corner, I know the species only from lowland "rain" forest, where it occurs at mud-bottomed small streams or even trickles one can jump across, at small marshes and swampy dips, but not, in my limited experience, at extensive forested swamps or along tree-lined rivers. Apparently this short-legged, high-"kneed" heron crouches on low banks or matted marshy vegetation from which it lunges at prey in the shallow water. I have seen it only singly.

The bird was already aware of me at almost every meeting. Alarmed, it would stretch its disproportionately long neck straight and high, as does a bittern. Mounting higher in the marshy or thickety vegetation, it would nod its head, twist its neck to look around, slowly twitch its tail, and maybe utter a low "kōōkōōkōōkōōk." It did not freeze as does a tiger bittern (*Tigrisoma*), for example. It would also rise in the trees to stand quietly, say, on a thick horizontal vine or bough some 50 feet up. In life its upper neck, head, and very long beak appear snakelike. The neck down to the kink is almost as slender as the head and beak, then quickly broadens and is very thick at the base, as in the tiger bitterns. The head and beak usually extend hori-

zontally from the flattened S of the neck. When retracted, the neck up to the throat is drawn completely into the body and adds to its bulk, as in the Green Heron. Its cry is a piglike bass rattling "krurr."

Nycticorax nycticorax (Linnaeus)

BLACK-CROWNED NIGHT HERON

RANGE: Cosmopolitan except Australia.

Nycticorax nycticorax hoactli (Gmelin)

RANGE: Canada to Tierra del Fuego; West Indies.

The Black-crowned Night Heron in Costa Rica consists probably of residents and possibly migrants. In the absence of breeding data, a record for June 22 (Sassi, 1938, p. 291) suggests that the species summers and probably nests there. There are relatively few reports in all, and my own observations are few and confined to the winter and spring. The bird is fairly common in suitable marshy habitat in the dry-forested northwest, especially the open Guanacaste lagoon country, thence northward to Liberia at least. There, individuals from time to time fly out of scattered low trees and tall thickety and bushy growth amid the marshes and flooded pastures frequented by a great variety of water birds. At Miravalles, beside the continental divide in the northwest, I encountered the bird, once, as immobile as an owl on a foliated branch alongside a shaded stream in gallery forest. The circumstances were similar to those quoted by Rendahl (1918-1920, p. 6): "A low rustle was heard in the densest leafage above us, and with long cautious strides a white-breasted 'Correo,' Night Heron, stalked along the branches, suspiciously looking round, and at the least noise concealing itself behind the trunk or a thicker branch. But as a makeshift it took its recourse to the wings." Elsewhere on the Pacific slope the bird has been recorded only from the vicinity of San José; it remains unknown in the southwest, where it almost surely occurs. On the Caribbean side it is common only in the Río Frío region, where it can be seen on the ground and in the trees along overgrown river banks. Otherwise I know of it from only two localities: the mouth of the Río Matina and the pond of the Inter-American Institute near Turrialba (altitude 2000 feet), where I found

it at irregular intervals roosting in reeds by day and hunting along the margins in the early morning (and probably at night.) Its cry is a "wok" or "wuk."

Nyctanassa violacea (Linnaeus)

YELLOW-CROWNED NIGHT HERON

RANGE: United States to Peru and Brazil; northern birds winter southward.

Nyctanassa violacea violacea (Linnaeus)

RANGE: Breeds from eastern and central United States to Guatemala; winters to eastern Panama and in West Indies.

[**Nyctanassa violacea bancrofti** Huey

RANGE: Resident from western Mexico to El Salvador and in Bahamas and West Indies; recorded from Panama.]

The Yellow-crowned Night Heron in Costa Rica consists inferentially of residents and winter visitants. There are no breeding data, but individuals are present throughout the year. In the fall, occasional immature-plumaged birds wander rather extensively in the lowlands and even reach the central plateau; perhaps these are native young of the year. My observation in October of a few individuals, also immature-plumaged, standing in surf in the extreme southeast near Panama, suggests that these may have been migrants.

This night heron occurs mostly in the Pacific lowlands southward from the Tempisque basin to the swampy delta of the Río Térraba and the Golfo Dulce region. It is particularly abundant in the coastal lagoons and estuaries flowing through mangrove forest, where birds stand about on shaded branches overhanging the water. Reports from the Caribbean side are few. Carriker (1910, p. 431) "found it in the swamps just inside of the beach about twelve miles south of Port Limon," and it is probably present in good numbers along the coast northward to the Río San Juan. Elsewhere on the Caribbean side I have seen only immature birds: the extreme southeast (mentioned above), inland from Puerto Limón, and at the pond of the Inter-American Institute near Turrialba. Its cry is a quacking "kwock."

In Costa Rica the Yellow-crowned appears to be primarily coastal, with a preference for

estuaries and mangroves, whereas the Black-crowned occurs inland and seems to avoid mangroves.

***Tigrisoma lineatum* (Boddaert)**

RUFESCENT TIGER BITTERN

RANGE: Southern Mexico (?) to Bolivia and northern Argentina.

***Tigrisoma lineatum lineatum* (Boddaert)**

RANGE: Southern Mexico (?); extreme southeastern Honduras to Ecuador and Brazil.

The very few records of this Caribbean species stem almost wholly from the tropical belt, mostly the very humid northeast, also "Talamanca" in the southeast. Probably the bird occurs sparsely but continuously throughout the lowlands. There is an additional record from the subtropical upper Reventazón Valley. Though I met the bird only a few times at but one locality in the Sarapiquí lowlands, I am of the opinion that it is a true forest species that may visit neighboring river banks at night. It frequents densely wooded streamsides and heavily shaded marshy spots, situations in which I have seen it skulk along muddy margins and stalk along half-submerged fallen trunks in daytime. Disturbed, it may walk out of sight by rounding a bend in the stream or, flying up a few yards in the vegetation, freeze and allow a close approach. I have no information on the comparative ecology of this seldom-seen species and the following rare one.

***Tigrisoma fasciatum* (Such)**

FASCIATED TIGER BITTERN

RANGE: Costa Rica to Venezuela, Peru, Bolivia, and northern Argentina.

***Tigrisoma fasciatum salmoni* Sclater and Salvin**

RANGE: Costa Rica to Venezuela and Peru.

On August 30 and 31, 1952, I collected an immature male and an adult female of this South American species, previously unrecorded in Central America, at an altitude of 800 feet between Guápiles and Carrillo at the northern base of the Irazú-Turrialba volcanic massif. I met it again two years later at about 350 feet at the base of the Talamanca Cordillera in the Sixaola region, beside the Panamanian frontier. Mr. E. Eisenmann, who has

discovered several misidentified specimens from southern Central America in museum collections, informs me of a Costa Rican bird, now in the British Museum, taken April, 1895, by Underwood at Carrillo, and I found another (M.N.C.R. No. 7442), an immature, taken August 1892, by A. H. Verrill at Jiménez. The nomenclature used above is that of Eisenmann (MS).

In Costa Rica, the species is apparently confined to the Caribbean slope and restricted to very wet portions of the tropical belt, possibly upward through the transition to the contiguous wet subtropical belt, mostly in the northeast. Like *lineatum*, with which it appears to be sympatric geographically and ecologically, it is a true forest inhabitant that seems to prefer hilly terrain. In the northeast I saw it occasionally in trees bordering the swift-flowing, boulder-strewn, forested Río Blanco, also standing on the ground in sun-flecked glades in forest. In the southeast I found it again in heavily forested country at the Río Suab, a slow-flowing sand-bottomed stream. Its relatively short beak, which brings to mind that of a night heron, perhaps provides the clue to the sympatric occurrence of this species with the longer-billed *lineatum*.

***Tigrisoma mexicanum* Swainson**

BARE-THROATED TIGER BITTERN

RANGE: Northwestern Mexico to northwestern Colombia.

Complementing the two preceding Caribbean members of its genus, the Bare-throated Tiger Bittern is distributed primarily on the Pacific slope, where it is virtually confined to the lowlands. It is common to abundant in appropriate habitat in the basin of the Río Tempisque and its tributaries and has been recorded on the slope of the northwestern divide, where I found it near the upper limit of the tropical belt at Hacienda Miravalles and farther north on the lowland approach to Rincón de la Vieja Volcano. Southward from the Gulf of Nicoya it is common coastally, especially in mangroves, as in the strip between Parrita and Quepos, the Térraba delta, and the Golfo Dulce region. On the Caribbean side, except for the Guanacaste-like Río Frío region, it is rare, being known only from four widely separated localities, three of them in

the tropical belt in the northern (Río San Carlos), northeastern (Guápiles), and east-central (Waldeck) sectors, the fourth in the upper subtropical belt near the headwaters of the Río Reventazón (Río Macho). Hence it occurs in at least partial sympatry with *lineatum* and *fasciatum*.

In my experience it is not an inhabitant of forest even though occasionally found in forested regions. In the subhumid Pacific northwest and south of Lake Nicaragua on the Caribbean side it occurs along gallery-forested streams, in boggy patches of edaphically moist woodland, and at marshes and swamps. Elsewhere, in the humid life zones, it frequents the wooded edges of streams in plantation type of country or in cutover areas, swampy places, and mangroves. It can be seen standing in small clearings as well as exposed (or largely hidden) on a branch near the top of a tall tree. It visits mud flats, and I have even seen it on a log jam in open water. I would guess it was collected in similar sorts of nonforested situations on the Caribbean side. The bird forages, of course, afoot. It prefers to build its crude nest on an overhanging bough usually 15 to 20 feet above a stream. Normally it flies easily but slowly with retracted neck and a slight accent on the upstroke. When it is disturbed into labored, retarded flight, its legs hang, its neck is outstretched, and the bird utters a series of *Cochlearius*-like, heavy "kwok"s.

***Ixobrychus exilis* (Gmelin)**

LEAST BITTERN

RANGE: Southern Canada to Paraguay and Brazil, Bahamas and Greater Antilles; northern birds winter south to Colombia.

[*Ixobrychus exilis exilis* (Gmelin)]

RANGE: Breeds in central and eastern North America to, probably, Nicaragua and possibly Costa Rica, also in Greater Antilles; winters to Colombia.]

***Ixobrychus exilis hesperis* Dickey
and van Rossem**

RANGE: Breeds in western North America, winters to Costa Rica.

The only Costa Rican specimen (C.N.H.M. No. 156326) apparently belongs to the race

hesperis. This bird was collected August 16, 1929, by Austin Smith at Ballena in the Tempisque Valley, Guanacaste. The date and the fact that the testes of the bird were enlarged suggest a breeding individual.

I saw the species only once, on June 18, 1951, at Laguna Chiquita in the upper tropical belt on the eastern slope of Turrialba Volcano. This late date suggests a resident, possibly of the race *exilis*, rather than a lingering migrant. The bird was frequenting the reeds and bushes along the margins of this small lake. I did not happen to see the species at neighboring Laguna Grande.

Recently several Least Bitterns were observed by Donald A. Jenni (written communication) during July-August, 1963, at the pond of the Inter-American Institute of Agricultural Sciences near Turrialba. These birds almost unquestionably represent a lately arrived incursion.

***Botaurus lentiginosus* (Rackett)**

AMERICAN BITTERN

RANGE: Breeds in North America; winters to Panama and in West Indies.

The American Bittern, a winter visitant, is known from only four localities, all in the region of the central highlands. The last report was in 1907. Apparently it was not rare on the central plateau, where the marshy habitats have since largely disappeared. The species should be expected under suitable conditions almost anywhere in the country, but I did not find it, not even in the Río Frío region (in April).

***Botaurus pinnatus* (Wagler)**

PINNATED BITTERN

RANGE: Southern Mexico, southern Nicaragua, Costa Rica, and South America from Colombia, the Guianas, and Trinidad to western Ecuador and northern Argentina.

The only Costa Rican record is that of Dale E. Birkenholz and Donald A. Jenni, who very recently collected a bird at a fresh-water marsh on the grounds of the Inter-American Institute of Agricultural Sciences near Turrialba (altitude 2000 feet). The specimen (A.M.N.H. No. 768815), a female apparently in breeding condition (largest ova, 4 mm.), was taken July 17, 1963. "A bittern was also

seen July 9, and one was heard July 12, and 2 were heard July 18 and August 4" (D. A. Jenni, personal communication).

In Costa Rica the species appears to be restricted to the Caribbean slope. In view of the new record cited above and an old one from nearby Greytown, Nicaragua, it probably occurs in the swampy coastal lowlands north from Puerto Limón. It is unquestionably present in the Río Frío region, near Lake Nicaragua, as Thomas R. Howell (oral communication) has found it on the Nicaraguan side a stone's throw from the Costa Rican boundary.

Recently Dickerman (1961) described a race, *caribaeus*, from the eastern slope of southern Mexico, at the same time assigning the specimen from southeastern Nicaragua to the nominate and widespread South American form. *Caribaeus* differs from *pinnatus* in tone of coloration and extent of markings as well as in shorter mean length of wing and tail, while its culmen averages longer (*ibid.*). The Costa Rican female approaches the description of *caribaeus* in general appearance and its wing is even shorter (by 1 mm.) than in the smallest bird of the same sex. Its culmen, however, is shorter than that of any of the Mexican birds and measures the same as the mean of that of the South American birds. Its tail is shorter by 3 and 6 mm., respectively, than that of the shortest-tailed females of *caribaeus* and *pinnatus*. In view of the anomalous geographic distribution of the above-mentioned characters and the not inconsiderable individual variation, I prefer to consider the species provisionally as monotypic.

FAMILY COCHLEARIIDAE

Cochlearius cochlearius (Linnaeus)

BOAT-BILLED HERON

RANGE: Mexico to Bolivia and north-eastern Argentina; Trinidad.

Cochlearius cochlearius zeledoni (Ridgway)

RANGE: Mexico to northern Costa Rica.

Cochlearius cochlearius panamensis Griscom

RANGE: Southwestern Costa Rica and Panama.

The Boat-billed Heron is distributed the

length of both slopes, much more commonly the Pacific than the Caribbean, mostly in the lowlands. On the Pacific side it is met regularly in the basin of the Río Tempisque and its tributaries and elsewhere along the coast at least as far as the lower Térraba Valley; there is no report from the Golfo Dulce region, where I should have expected it. I found, to my surprise, a small colony in the hills beside the upper Térraba Valley (at Vijagual). On the Caribbean side, where it is known from about half a dozen lowland localities, it is, with the exception of the Río Frío region, rare or seldom seen; it has not yet been recorded south of the latitude of Puerto Limón. I also found it at Laguna Grande on the lower eastern slope of Turrialba Volcano and, rarely, at the pond of the Inter-American Institute near Turrialba (altitude 2000 feet). I find it difficult to separate Costa Rican birds taken on the Caribbean slope and in the Pacific northwest from those taken in the southwest. Also, a number of specimens from both slopes in Costa Rica are either indistinguishable from or much closer to *panamensis* of Panama than to *zeledoni* of northern Central America and Mexico.

The species inhabits mangrove jungle and patches of woodland, sometimes the periphery of tall virgin forest, alongside a sluggish muddy stream or stagnant water, as at a pond or mangrove swamp, almost always in the shade of arboreal vegetation. It is encountered, as a rule, in highly sedentary groups of three to several members; a lone individual is generally a young bird, presumably a wanderer. In daytime the birds sit inactive on branches from a few feet above the shallow water to medium heights in the trees. Apparently oblivious of the observer they can with caution be approached quite closely. Disturbed, they react by squawking, flicking their tails, which normally are covered by the rounded wing tips, and fluttering higher to better concealment. Perching slouched, the bird looks humpbacked, its scoop-shaped beak points diagonally downward, and its pendent "hairy" crest rests on its back; the placement of the very large black eye (really dark reddish) at the base of the beak harmonizes with the pattern of the head. Occasionally, as when unduly alarmed, it makes short flights. It flies with the neck retracted

and sails with the neck extended, head held high, and crest raised.

I have not seen this nocturnal species feed. Rendahl (1918-1920, p. 7) quoted Dr. Bovalius, in Nicaragua, as follows: "At the shallowest places of the lagoon the 'Coaca' waded about, picking up fishes with a surprising rapidity.—At a slight splashing of a paddle it disappeared with hurried, stealing steps among the tree-roots and lianas, where it emitted its anxiously belling cry." Wetmore (1960, p. 10) "found them feeding in shallow waters, often in riffles where they scoop at their living prey, rather than spear at it as is the custom with the typical herons." One of the Costa Rican names of this deep-voiced noisy bird is an onomatopoeic "chocuacua." This call is often protracted into an excited-sounding "ook ook qua qua qua ook ook." The bird also utters a series of throaty "knocking" sounds.

FAMILY CICONIIDAE

Mycteria americana Linnaeus

WOOD STORK

RANGE: Southeastern United States to Peru and east-central Argentina; Cuba and Dominican Republic.

The Wood Stork is exceedingly abundant in flooded lowland Guanacaste, as at the head of the Gulf of Nicoya. It is present, perhaps only seasonally, at suitable habitat along the western face of the Guanacaste Cordillera. A secondary center is the Río Frío region and perhaps the length of the south shore of Lake Nicaragua. From the Gulf of Nicoya it continues southward in smaller numbers through the marshy lowlands that border the Pacific coast to the far southwest, where it has been reported from Puerto Jiménez in the Golfo Dulce region; I did not see it at Rincón de Osa. Other than the Río Frío region, it occurs only erratically in the Caribbean lowlands, where it has still not been recorded from the southern half of the country. Possibly it is present in fair numbers in the coastal swamps northward from Puerto Limón. The species seems to make seasonal migrations within the country, perhaps from coast to coast. Thus, a party of soaring birds may show up inland almost anywhere, including, rarely, the central plateau. Normally an altitude of 2500 feet or so marks its upper limit.

Occurring in mangroves, marshes, wooded swamps, copses, and at tree-lined streams, it has a much greater habitat tolerance than its relative, the Jabiru. Individuals to the hundreds may band together in lowland Guanacaste. Foraging as a unit, mostly in shallow pond-sized dips, ditches, or canals in open marshy country, the birds form a thickly ranked line and shuffle all in the same direction, with their beaks immersed. This hunt appears to be communal, designed to drive prey through a gauntlet. Jabirus and herons may sail down to share the feast without laboring in its preparation.

Wood Storks on sunny days spend much time soaring, apparently for the sake of it. Sailing and circling on motionless wings to almost invisible heights, the black-patterned white birds resemble King Vultures to the naked eye. The birds in flight, often in follow-the-leader flocks, alternate flaps and glides. At close range the wings, spreading $5\frac{1}{2}$ feet, can sometimes be heard to whirl, and a large flock frightened into the air produces a great, almost an awesome, sound. But unless the birds mount high, their graceless flaps, straining necks, and trailing legs soon mar the effect. Occasionally the Wood Stork gives voice to a harsh croak, not much different from that of the Great Egret, a species with which it is often found.

Jabiru mycteria (Lichtenstein)

JABIRU

RANGE: Southern Mexico to Bolivia and northern Argentina.

The Jabiru is known almost exclusively from the lower Tempisque drainage and the Río Frío region, where up to a dozen or more scattered individuals can be seen at a time, quite commonly in the former, less commonly in the latter, region. It has also been reported with the Wood Stork at Miravalles, where I did not happen to see it. It is found at shallow lagoons and marshy, grassy fields in open country together with Wood Storks, herons, spoonbills, White Ibises, and other water birds. Sometimes a lone individual frequents the wet portions of an open pasture. In such places crabs may live in the mud beneath the grass, and tide-borne fish, often left stranded, enter shallow channels. Favoring flat open reaches on which an intruder can be spied

from afar, individuals usually stand about quietly, either alone, or, if in groups, comfortably spaced apart. Sometimes a bird stands on one of the low trees scattered about, thus commanding an even wider view. Its arboreal nest, however, I have found well inside a grove. The same nest, incidentally, seems to be used year after year, and the birds return to it in December or January.

A bird attempting to leave the ground beats its wings, rises a bit, falls back, and bounces up again with a stiff leap before becoming airborne. Flight is heavy and slow. Owing to a slight accent on the upstroke its flaps are jerky, unlike those of the Wood Stork. Its too-heavy head and neck, so to speak, droop below the horizontal, and its trailing legs dangle, so that the flying bird looks bowed in lateral view. Its partially retracted, or kinked, neck, the skin at its base hanging like a pouch, contrasts with the straight neck of the Wood Stork. As the Jabiru soars frequently at great heights, as does the far more abundant Wood Stork, its great size can be appreciated when the two are together in the air. The sailing Jabiru, as seen from the ground, features a double-curved wing profile: the wings arch concavely for most of their length, then belly convexly from the wrist to the tips of the spread primaries. A bird preparing to land often sails around for a while as though carefully planning a safe headwind approach.

One of the largest flying birds in the Western Hemisphere, it stands perhaps the tallest. Its immense beak, wickedly pike-shaped, its naked neck, an erect black column "angrily" red at its inflated base, and its lordly height personify dignity and strength and also suggest to the observer that he exercise caution. The native name, "galán sin ventura," perhaps arose from the impression it gives of lonely brooding. I have not heard the Jabiru make a sound, not even the bill-rattling of captive birds.

FAMILY THRESKIORNITHIDAE

Mesembrinibis cayennensis (Gmelin)

GREEN IBIS

RANGE: Costa Rica (and probably adjacent Nicaragua) to Bolivia and extreme northeastern Argentina.

The Green Ibis is confined to the Caribbean slope, where it is distributed very locally in

the tropical belt. To my knowledge there are only two specimens, dating from 1873 and 1874, both in the United States National Museum, collected somewhere in the south-east ("Talamanca"). I met the species under differing circumstances at only two areas: the Sarapiquí lowlands and the Río Frío region. Also, I was told of "black" ibises, presumably this species, that had been seen from time to time at the northern base of the Cordillera Central. Probably it occurs also in the lower subtropical belt.

In the eastern Caribbean lowlands the bird is found at irregular intervals throughout the year in extensively wet-forested "wild" regions. It frequents small marshes beside or surrounded by virgin forest, heavily timbered swamps inside forest, and forested streams with muddy banks. Though sometimes seen singly and in two's, this ibis apparently roams about, often noisily, in three's or four's that fly, with the accent on the upbeat, at tree height along the borders of and breaks in forest in search of suitable habitat. Usually, when I happened upon these wary birds, they flushed from the ground and, obviously alarmed, rose high in the trees. There they stood on branches, generally blocked from view by foliage, sometimes exposed, up to an hour or more. In the open Río Frío region, by contrast, I saw well-separated single individuals afoot along muddy river banks, as well as a loose group in an open marsh nearly enclosed by low second-growth woods.

Short-legged and long-billed, this species seems to forage largely by probing mud. At any rate its beak, which appears markedly drooped toward the tip, is usually covered with mud. When apprehensive and disturbed, the bird looks about jerkily, turning its head and beak through a wide arc and moving its body slightly from side to side, nods, and punctuates the nods and turns with a dull, low, throaty cluck. The call given during extended flight is a hollowly rattling "klawklawklawklawklaw." Foraging or resting birds make either a short, sort of watery "koke" or "uk" or a very hard "koke" as loud as the rap of a big woodpecker.

Eudocimus albus (Linnaeus)

WHITE IBIS

RANGE: Southeastern United States to Peru and Venezuela; Greater Antilles.

The White Ibis is primarily a Pacific species found the length of the Pacific coastal lowlands, including the Gulf of Nicoya and the Golfo Dulce. It is plentiful in the Guanacaste lagoon country and, southward, occurs locally at river mouths, deltas, and embayments. Except for the Río Frío region, where it is common, it is known on the Caribbean side from a single 80-year old sight observation in the Sixaola region. Possibly it is present along the coast north of Puerto Limón; perhaps it wanders or migrates from coast to coast across the lowlands fronting Lake Nicaragua and the Río San Juan. It is almost surely resident in Costa Rica despite the lack of breeding evidence.

Seen in small or large groups, among which immature-plumaged individuals are common, it inhabits open marshy country and tidal flats. Though it probes mud, it is always separated ecologically from the Green Ibis of similar habit and, occasionally, habitat. It forages, of course, afoot and perches on low mangrove tangles and on trees. A good flyer, its wing beats are quicker than those of a heron and more like those of a duck, but they alternate with short sails.

***Plegadis falcinellus* (Linnaeus)**

GLOSSY IBIS

RANGE: Old World, eastern and southern United States, and Greater Antilles; in New World, northern birds found casually southward to northern Colombia in winter.

My only observations of this species date from April 3 and 4, 1962, at Caño Negro in a flat treeless portion of the Río Frío region. There I watched five identically plumaged adults through a 40-power telescope at distances down to 30 yards. The birds kept together as a group for the most part, though sometimes were well separated from one another, in the shallow *caño* so singularly free of aquatic vegetation. Occasionally an individual visited a muddy bank, usually in proximity to a Limpkin and small sandpipers (*Erolia*). Whether standing or wading in the *caño*, generally in the noisy company of Stilts, the constantly foraging birds kept dipping their heads and beaks up and down like a machine.]

***Plegadis chihi* (Vieillot)**

WHITE-FACED IBIS

RANGE: Breeds from western United States

to Mexico, also in South America from Peru and southeastern Brazil to central Chile and Argentina; northern birds winter to southern Mexico and casually to southern Central America.

The only record is that of Cherrie (1893, p. 52), who collected a specimen in the lower Térraba Valley at an altitude of 10 meters. Cherrie stated only that it was not common. I do not know the whereabouts of this specimen, or whether it is an adult or immature. I did not meet the species.

***Ajaia ajaja* (Linnaeus)**

ROSEATE SPOONBILL

RANGE: Southern United States to Chile and Argentina; Greater Antilles.

The Roseate Spoonbill is unquestionably native in Costa Rica. Though there are no breeding records, I collected a female with a fully formed egg in its oviduct on December 3, 1950, near Santa Cruz in the Nicoya Peninsula. The species is distributed primarily through the Pacific coastal lowlands, from the Guanacaste lagoon country, where it is common, southward in small concentrations at river mouths and swampy deltas to the Golfo Dulce. It evidently finds suitable habitat along the lower slopes of the northwestern divide, where it has been met at Miravalles both by Underwood and myself. It is fairly common in the Río Frío region, but is known from only three places elsewhere on the Caribbean side: Guápiles, at the northeastern base of the Cordillera Central (Carriker, 1910, p. 247; Crandall, 1914, p. 329); Manila, on the Río Pacuare north of Puerto Limón, where I obtained an immature bird; and, once, at the pond of the Inter-American Institute near Turrialba. Also, there are two records from the vicinity of San José. Judged by the dates and the rare occurrence on the central plateau and the eastern Caribbean slope, it would appear to be a seldom-seen postbreeding wanderer from the Pacific northwest and the shores of Lake Nicaragua. Where met regularly it occurs in groups of two to several individuals.

The bird feeds by sweeping its beak from side to side while wading forward rather deeply in shallow water. Its body has nearly twice the bulk, and its legs, especially the "thighs," have twice the thickness, of those of a heron of similar size. Often it stands with a

leg partially lifted and extended back. It walks with the long axis of its body horizontal and a slight side-to-side swish of its hindquarters. A heron, by comparison, stands rather erect and walks with a slight up-and-down movement of the hindquarters. When fluttering from one spot to another, the spoonbill appears humpbacked on account of its hanging neck and head. In normal flight its neck is extended and its wings appear inserted well to the rear of the body. The only sound I heard was a heavy, low "cook-cook-cook."

FAMILY ANATIDAE

Dendrocygna viduata (Linnaeus)

WHITE-FACED TREE DUCK

RANGE: Tropical Africa, Madagascar, Costa Rica to Bolivia and east-central Argentina.

The White-faced Tree Duck is known in Costa Rica only from the lowlands at the head of the Gulf of Nicoya. There, at the northern limit of its New World range, it is represented by an isolated, undoubtedly resident population. It had been previously recorded in April, June, and July, and I met it a few times in December. The place to look for it, of course, is the Guanacaste lagoons, where it occurs together with the congeneric Black-bellied. Only by investigating flocks of hundreds of the Black-bellied may a few White-faced individuals be discovered keeping together in a tight block.

The species is as distinct in color and pattern from the larger Black-bellied as from any other duck in the country. In the air it resembles the Black-bellied in silhouette and manner of flight, but the uniform rich brown of its back and wings distinguishes it from any other duck, including the Black-bellied. In both species of *Dendrocygna* the wings are much broader and are beaten more slowly than are those of any migrant or native duck. Only the Pintail has the neck so long and slender. In flight, only the tree ducks have the neck hanging, as though strained, a little below the horizontal or the legs extending beyond the tail.

Its voice is similar to that of the Black-bellied but differs in its three-note pattern. The call, "wíss weeteé," sounds like that of the Kiskadee Flycatcher, impregnated with the squeal of the tree duck. Usually the call is

difficult to distinguish amid the enveloping cries of the swarms of the Black-bellied.

Dendrocygna autumnalis (Linnaeus)

BLACK-BELLIED TREE DUCK

RANGE: Southwestern United States to Ecuador and northwestern Argentina; casual in West Indies.

Dendrocygna autumnalis fulgens Friedmann

RANGE: Southern Texas to Costa Rica; northern birds winter southward.

This, the only common native duck, is confined largely to the lagoon country and similar habitat in the dry-forested Pacific northwest. In the Río Frío region it is represented seasonally in large numbers by individuals that have arrived possibly from Nicaragua. Elsewhere on the Pacific side it occurs in suitable habitat, sometimes even at water-filled dips, northward to Miravalles and southward to the Puntarenas-Barranca district; it is as yet unknown in the wild anywhere in the southwest. Occasionally it reaches the few ponds or lakes that still exist on the central plateau. Except for the Río Frío region it is virtually absent from the Caribbean slope, where I know it only as a very infrequent visitor at the pond of the Inter-American Institute of Agricultural Sciences near Turrialba. Hence its pattern of distribution, primarily the northwestern quadrant of the country, conforms to that of the Mexican-Central American arid Pacific avifauna and leaves a considerable gap between Costa Rican and Panamanian birds. Very likely the Costa Rican population is augmented in winter by migrants from the north.

In lowland Guanacaste the Black-bellied is present almost literally in clouds, at any rate during the dry season, when it is second in numbers only to the wintering Blue-winged Teal. Like the latter, it prefers grassy lagoons thick with floating plants and a good deal of exposed mud. Sometimes it perches on bushy scrub, hardly ever on trees. Occasionally in November and December I witnessed an injury-feigning individual flutter helplessly in the marsh, ostensibly unable to rise at all or more than a few feet at most before dropping helplessly, meanwhile keeping up a frantic "oo-eek" similar to that of the Wood Duck (*Aix sponsa*) of the United States. This dis-

play, aimed to distract attention from the downy ducklings usually invisible in the floating vegetation, makes the parents easy game for hunters. The survival of the species in Costa Rica will depend largely on continued inaccessibility of the habitat to the arms-bearing public and the rejection of swamp-drainage programs.

Afoot, the legs of this bird appear unusually long and sturdy, its extended neck is considerably longer than that of ducks generally, and the long axis of its body is at a 45-degree angle rather than horizontal as in other ducks. Swimming, its body appears to be tipped forward, the base of its neck, like that of the Pintail, rests low in the water, and a crease runs down the middle of its broad-feathered, smooth back. The subadult, smaller than the adult and lacking pink on the soft parts, shows a black smudge on the front of the neck. The half-grown downy young bears a resemblance to the female Masked Duck, though the width, extent, and pattern of banding on the head and neck are different; it hides amid floating mats and dives when disturbed.

This is a very noisy duck that almost always calls when in the air. It utters squeaky squeals sounding like "peéchee" or "peéchichichi." The only other duck in the country that calls freely is the similar-voiced *viduata*.

***Cairina moschata* (Linnaeus)**

MUSCOVY DUCK

RANGE: Mexico to Bolivia and northern Argentina.

This large duck, almost restricted to the tropical belt, is known primarily from the Pacific slope. As with so many other water birds, it is found in greatest concentration in the Guanacaste lagoons, from the head of the Gulf of Nicoya outward into the Tempisque-Bebedero watershed, where it is met more or less regularly. In appropriate habitat it occurs northward to beyond Liberia and upward in the tropical belt to the Guanacaste Cordillera (Hacienda Miravalles). Elsewhere on the Pacific slope it is known again far to the southwest, both in the Térraba and Golfo Dulce regions, where it is encountered occasionally; it is probably present in the intervening lowlands. It is rare on the central plateau; it was seen only twice by C. H. Lankester in the past half century. Except for

the Río Frío region, where it is fairly common, the species is apparently rare on the Caribbean slope: Carriker (1910, p. 434) once saw a single bird in flight near Guácimo; twice I saw a single bird flying along the Río Puerto Viejo; and it visits very infrequently the pond of the Inter-American Institute near Turrialba (altitude 2000 feet). I know of no other Caribbean report.

In lowland Guanacaste and the Río Frío region the Muscovy Duck inhabits wooded marshes, flooded wooded portions of the ranch lands, and gallery-forested watercourses. It is seen singly, in two's and three's, and in groups of as many as a dozen or so individuals. Avoiding open stretches of otherwise suitable habitat, it does not normally associate with other ducks. A wary bird, it takes flight at the slightest provocation. Though relatively slow on the wing, its measured beats carry it deftly through the arboreal vegetation. Besides feeding afloat, it may forage in a rice field some distance from a watercourse (Carriker, *loc. cit.*). At the advice of cowboys in the Tempisque region, I once stationed myself toward dusk in a particular grove of tall trees. Sure enough, a number of Muscovies, both adults and immatures, arrived shortly afterward to roost on high branches. In my experience the bird is uniformly silent.

***Anas acuta* Linnaeus**

COMMON PINTAIL

RANGE: Breeds in Holarctic Region; in New World winters south to Colombia and in West Indies.

This migrant duck was previously recorded several times as wintering in small numbers on scattered ponds over the central plateau. On the Caribbean slope, below the plateau region, a few individuals have been appearing each year at the pond of the Inter-American Institute of Agricultural Sciences near Turrialba, and it occurs also on the Bonilla lakes, the Sarapiquí lakes, and possibly in coastal situations. For all of the southwest there seems to be only my observation, in January, of a few individuals at the pondlike dips and depressions in the savannas at Buenos Aires. The species is very common, however, in the shallower parts of the flooded fields and grassy lagoons, often choked with water plants, at the head of the Gulf of Nicoya. In

this generally open, marshy habitat it rafts with other migrant, tipping ducks. When disturbed the birds rise as a mixed-species swarm and fly about for a while before settling farther off, either still in view or out of sight in a nearby lagoon.

[*Anas platyrhynchos* Linnaeus

MALLARD

RANGE: Breeds in Northern Hemisphere; in New World winters to Mexico, recorded south to Panama and in West Indies.

The inclusion of the Mallard in the Costa Rican avifauna seems to have been based on its mere listing by Zeledón (1887, p. 132). Carriker (1910), who relied on specimen records, did not include it. Rendahl (1918-1920, p. 7) quoted Dr. Bovallius to the effect that great flocks of Mallards occurred at El Boquete, Peninsula Menco, Lake Nicaragua, just north of Costa Rica, and there are several records from Panama to the south.

Despite a considerable amount of time spent in the Guanacaste lagoon country, which teems with migrant waterfowl, I did not see it there. However, I noted two females on several occasions during the winter of 1950-1951, at the pond of the Inter-American Institute of Agricultural Sciences near Turrialba.]

[*Anas cyanoptera* Vieillot

CINNAMON TEAL

RANGE: Western North America to northern Mexico, also south-central South America; recorded in Central America and northern South America.

José Zeledón (1885, p. 114), without comment, listed this species as represented by a Costa Rican specimen in the United States National Museum. An inquiry addressed to that institution brought the reply by H. G. Deignan (November 21, 1956): "no specimen here; probably a misidentification of a blue-winged female." It would not be unreasonable to expect an occasional migrant in Costa Rica, but there is still neither a sight report nor a specimen.]

Anas discors Linnaeus

BLUE-WINGED TEAL

RANGE: Breeds in North America; winters from southern United States southward.

Anas discors discors Linnaeus

RANGE: Breeds in North America (except Atlantic seaboard); winters from southern United States to Peru and Brazil, West Indies, and Galapagos Islands.

The Blue-winged Teal is the earliest of the migrant ducks, as it arrives in fair numbers before the end of September. It is apt to occur almost anywhere, from the coasts to the central plateau, but is abundant only in lowland Guanacaste and, probably, the Río Frío region. It is easily the most common wintering duck, outnumbering any other species, except perhaps the native Black-bellied Tree Duck, 50 or 100 to one. An occasional bird remains through the summer.

Favoring shallow water covered with floating plants, it finds ideal conditions in the flooded open country at the head of the Gulf of Nicoya. There it masses in floating rafts, sits about on drowned fence posts, or crowds its fellows on trunks and limbs that rise diagonally from the water. The problem is not to decide which are Blue-wings but what other species may be present in the crush. Though a surface feeder, it tips little; very seldom it may dive for a moment or two. Both sexes sometimes exhibit a peculiar nodding in which the beak is lifted and lowered through a vertical arc at each rise and fall of the neck. From time to time individuals flutter clumsily for a few yards. But in true flight the birds rise directly into the air, fly smoothly and very rapidly, and twist and turn en masse with the easy abruptness of shore birds. Despite their swift flight, a hunter cannot miss getting a full bag with a single shotgun burst. Especially after the first of the year, when the drying of the lagoons compels the birds to congregate in shrunken dips, the so-called hunting of this persecuted species becomes slaughter.

The bird is usually silent. Light quacks may be heard from females taking flight, sometimes whistling sounds similar to the swishing of wings from flying males.

Anas clypeata Linnaeus

NORTHERN SHOVELER

RANGE: Breeds in Northern Hemisphere; in New World winters south to Colombia and in West Indies.

Together with most other ducks in Costa

Rica, the migrant shoveler is confined largely to the Guanacaste lagoons at the head of the Gulf of Nicoya and suitable portions of the Tempisque basin. Though not numerous, it winters there regularly in marshy habitat with open shallow water. It also occurs in much smaller numbers at thicket-bordered ponds still remaining on the central plateau, as at Las Cónovas east of Cartago. The only other place I have seen this surface-feeding duck is the pond of the Inter-American Institute near Turrialba. No doubt it occurs yearly at other lakes in the country.

***Anas americana* Gmelin**

BALDPATE

RANGE: Breeds in North America; winters to Colombia and in West Indies.

I found the Baldpate at only two localities. As might be expected, it is regular and common in the Guanacaste lagoons at the head of the Gulf of Nicoya, where it associates with other migrant ducks both on the water and when frightened into the air. In small numbers it is also a regular visitant at the pond of the Inter-American Institute of Agricultural Sciences near Turrialba. In addition, E. F. Rivinus found it on the lakes near Cariblanco de Sarapiquí. Numerically the Baldpate ranks above the Shoveler and far below the Pintail.

***Aythya collaris* (Donovan)**

RING-NECKED DUCK

RANGE: Breeds in North America; winters south to Guatemala and in West Indies; recorded in Costa Rica and Panama.

The Ring-necked Duck occurs more or less regularly, but very locally and in very small numbers, in Costa Rica, which lies well south of its main wintering grounds. Here one to several individuals of both sexes have been making a yearly appearance at the pond of the Inter-American Institute of Agricultural Sciences near Turrialba. Also, E. F. Rivinus (personal communication) has kindly informed me as follows: "On February 3 [1962] . . . I observed perhaps a dozen ring-billed ducks (both sexes) in company with widgeon and coot in the Sarapiquí lakes. A companion, Dr. Juan Heinsohn, of San Pedro, shot two of these birds, one male and one female, and I had an opportunity of see-

ing and handling them and correcting his misapprehension that they were lesser scaup." Additional observations in the Guanacaste lagoon country (where I did not find it), the Río Frío region, and at other lakes might result in the enumeration of additional sites.

The Ring-necked seems to seek the company of Lesser Scaups, which it resembles in appearance and habits, to that of other ducks, at least on the Institute pond. Like the Lesser Scaup and unlike the dabblers and tipplers, it prefers open water deep enough for diving. In keeping with the rarer wintering ducks generally, it never seems to utter a sound.

***Aythya affinis* (Eyton)**

LESSER SCAUP

RANGE: Breeds in northwestern North America; winters south to Ecuador and in West Indies.

The Lesser Scaup is an annual but uncommon winter visitant. Apparently the latest of the migrant ducks in the fall, it arrives by the end of November and remains perhaps until April. Numerically it ranks below the far from abundant Baldpate and Shoveler and well above the Ring-necked. It can be found each winter in the Guanacaste lagoons and irregularly on the central plateau. A dozen birds or more recur yearly on the pond at the Inter-American Institute of Agricultural Sciences near Turrialba. Elsewhere in the country it is met rarely or not at all, but I found it at Hacienda Miravalles beside the northwestern divide and in the vicinity of Buenos Aires in the southwest.

A true diving duck, it generally seeks the deeper parts of open water. Individuals group together, usually apart from other species of ducks, most of which are surface feeders. It does not rest so often or so long or seek concealment as do the others, nor have I seen it sit on mud or mats. Sometimes it swims low, with its tail down, like a grebe. It leaves the water only when taking flight. Both this and the preceding species are chunky ducks that dive continually. When taking off, they skitter along the surface as does a coot or grebe before rising into easy flight. Most other ducks in the country can rise straight up, virtually leaping into the air. The flying bird may repeat a weak "prrrup."

Oxyura dominica (Linnaeus)

MASKED DUCK

RANGE: Southern Texas to Chile and east-central Argentina; West Indies.

The Masked Duck is encountered very uncommonly. It is known from Laguna de Coris and Las Cónovas on the central plateau, Laguna de Sierpe in the southwest, and Bebedero in the Guanacaste lowlands. At irregular intervals several individuals of both sexes appear on the pond of the Inter-American Institute of Agricultural Sciences near Turrialba. Oddly, the chances of finding it are better in the foothills and on the central plateau than in the lowlands, though the simple requirement of a small body of calm water at least partly invaded by vegetation is met mostly in the largely unexplored coastal swamps. The bird seeks concealment, its habits render it inconspicuous, and it seems never to utter a betraying sound except, occasionally, by the male, an almost inaudible dull "oo-oo-oo" low in the throat.

In life this is a small, stocky, diving duck, with a long and rounded stiff tail. Sometimes it pushes itself onto a floating pad or a muddy mass of vegetation, but apparently not upon banks, either leaning on its chest or standing with its body barely clear of the ground. Afoot, its paddle-shaped tail is seen to be concave from below and composed of narrow, pointed, stiff feathers, and its very short dull-colored legs are set far apart near the rear of the body. Its body is chunkier, its tail longer, and its neck straighter, shorter, and thicker than those of any other duck in the country. The head is rather narrow across the crown and broadens markedly at the level of the cheeks; the merging of the beak with the crown leaves the bird virtually no forehead. It sits patiently, like a turtle, never walking and hardly stirring except to slide back into the water.

This highly aquatic duck floats low, seems to have no tail (generally invisible below the surface), and dives with the frequency and facility of a grebe, but with the difference that a tail can then be seen breaking the surface. Unlike a grebe, it shuns open water, preferring to remain immobile amid aquatic vegetation. Indeed, this duck does not ever appear really to swim at all, but pushes and

crawls through the leafy muck, half in and half out of the water, its flat tail adding resemblance to a mammal instead of a bird. It dives for most of its food and may change sites while submerged. The return to the surface, unlike the dive, causes not a ripple.

When spreading its wings, the bird reveals a white patch on the upper and under sides of the axillars. Since it flies seldom, the patches are usually of little aid in identification. When the duck does fly, it rises directly from the water, dashes in a low, straight line, and alights in a glide with its tail spread or else drops suddenly, like a stone. The white patches trace the mad flight and outline the almost semicircular arc of the beating wings. On occasion a bird nods its head very quickly up and down, especially when it has surfaced from a dive. At times a male acts "aggressively" toward neighboring individuals, and a short commotion and a few splashing dives, but no long chases, may result. The stiff tail, usually kept beneath or resting on the surface or at most held a little above the horizontal out of the water, hardly ever seems to be carried erect. Perhaps, as with the voice, display is reserved for special occasions.

[Oxyura jamaicensis (Gmelin)

RUDDY DUCK

RANGE: Canada to Guatemala; West Indies; central and eastern Andes of Colombia.

The only report of the Ruddy Duck in Costa Rica, apparently accepted without question in the literature, is that of Frantz (1869, p. 378), who, however, wrote of *Eristomata ferruginea* Gray as having been shot at Laguna del Derrumbe, high on Irazú Volcano. As this is the name of a South American species, I assume the specimen was subsequently re-examined and identified as *O. jamaicensis*. However, "no specimen of *Oxyura* collected by Frantz = Costa Rica has reached the Berlin Museum" (E. Stresemann, personal letter, January 14, 1960), which is the repository for Frantz's Costa Rican collection. Nor is the specimen present in the other institution to which it may have been sent, the United States National Museum. Hence the occurrence of the Ruddy Duck in Costa Rica is not proved. In view of Frantz's statement that a bird of this genus

had indeed been shot and presumably preserved, it could perhaps have been an immature or female of the native Masked Duck, a species that had not yet been recorded in Costa Rica.]

FAMILY CATHARTIDAE

Sarcoramphus papa (Linnaeus)

KING VULTURE

RANGE: Central Mexico to northern Argentina.

The King Vulture is primarily a tropical-belt species distributed along both slopes. It reaches lower subtropical elevations along the central highlands, the northwestern divide, and probably both sides of the Talamancan Cordillera; it is accidental or rare on the central plateau. It is most abundant, that is, regularly found perched and in the air, in the scrubby ranch lands of the Tropical Dry Forest and the neighboring deforested slopes of the continental divide. Elsewhere, adults and immatures, singly or in two's or three's, can be seen in the air at irregular intervals over partially cleared country and, to a lesser extent, over woodland. It is uncommon to rare in extensively forested regions and largely or entirely absent from the vicinity of towns.

As stated by Carriker (1910, p. 442): "They almost always come to the carcass of a cow or horse, and as a rule are not very shy, it being usually possible to approach within gunshot of them." It has been my experience, too, that the Black and Turkey Vultures make way for the King when it descends on a dead animal. Probably the greater quantity of deceased livestock in the subhumid northwest accounts for the greater prevalence of the bird there than in the rest of the country.

Coragyps atratus (Bechstein)

BLACK VULTURE

RANGE: Central and southeastern United States to southern South America.

Coragyps atratus brasiliensis (Bonaparte)

RANGE: Mexico to Peru, Bolivia, and southern Brazil.

The Black Vulture inhabits the entire republic from the beaches to the mountaintops, but is most abundant around settle-

ments. Perching on roofs in all the cities and towns, common in the capital city of San José, it is the best-known, most conspicuous, and most-despised bird in the country. Unlike the Turkey Vulture, it does not occur in woodland, even though it often soars over dense forest.

It is hardly necessary to stress the vital function of this species as a garbage-disposal agent and eater of dead animals: the more putrid the mess the better. A bird in the sky probably pays more attention to the behavior of distant vultures than to scanning the ground. Should an individual chance on a dead or dying animal, its descent signals the discovery to others, and so on. To the observer unaware of a nearby carcass, the stream of vultures arriving one at a time, all flying low in his direction, might suggest an exodus or mass migration. But should the observer, now sniffing the stench, follow it to its source, he will hear puffing sounds and the heavy rustling of stiff feathers as some of the birds nearest him try to flutter away. These are gorged individuals which, disturbed into unstable flight, lurch drunkenly, barely clearing obstacles, and soon settle heavily close by, either exhausted or unwilling to miss the next round. The packed crop, stretched until it protrudes from the chest, lies anterior to the center of gravity; perhaps it makes the bird top-heavy and throws it off balance when it tries to fly. The vultures still pulling hungrily at the carcass usually show little inclination to leave.

Cathartes burrovianus Cassin

YELLOW-HEADED VULTURE

RANGE: Southern Mexico locally through Central America to Peru and northeastern Argentina.

At the end of April, 1955, on the grassy lower western slope of Miravalles Volcano, I observed two immature birds of this species tacking about rather low in the air. Sweeping and quartering in a manner no different from that of a Turkey Vulture, they were instantly separable from the latter by the sharply defined whitish strap around the back of their heads. Despite hundreds of wishful glances at flying vultures, I did not find this species again until early April, 1962, in the Río Frío region near the southeastern corner of Lake

Nicaragua. Here, to my great surprise, it was perhaps more abundant than the Turkey Vulture. It gave no sign of being in migration, and people living there accepted its presence as a matter of course. Perched, it was blacker-plumaged than the Turkey, and its legs looked grayish white; in the air, the "window" near the tip of its wings was brighter than the pale outer primaries of the Turkey. The head was unmistakably yellowish. Apparently the species is somehow specially adapted to marshy or flooded open country, as at the Río Frío, yet it is absent from similar habitat in lowland Guanacaste.]

***Cathartes aura* (Linnaeus)**

TURKEY VULTURE

RANGE: Southern Canada through Central and South America; Bahamas and Greater Antilles.

[*Cathartes aura teter* Friedmann

RANGE: Breeds in western North America and Mexico; winters to Ecuador.]

***Cathartes aura aura* (Linnaeus)**

RANGE: Southern Texas to Costa Rica, probably to northwestern Panama, and in extreme southern Florida, Bahamas, and Greater Antilles.

Distributed over the entire country from sea level to the tops of mountains, the Turkey Vulture is the most common large bird after the Black. Both species are found in settled and wild areas, but the Turkey, unlike the Black, generally does not occur inside towns. In remote districts, on the other hand, the Turkey often nearly replaces the Black; it may even enter woodland, as the Black apparently never does. Superior to a Marsh Hawk at low quartering, it glides effortlessly with but slight adjustments of wings and tail to air currents. The Black is seemingly incapable of this type of flight. The Turkey is not aggressive as is the Black. Should the two congregate at a carcass, it is certain to be outnumbered in most places and to concede first helpings to the Black. It is not seen nearly so often on the ground, where the swaggering Black is a common sight. Circumstantial evidence leads me to believe that the Turkey finds some of its food by olfaction;

the Black does not. Like the Black, it produces a heavy hiss which sounds like a forced expulsion of air.

The Turkey Vulture appears to be represented by two forms, residents and migrants. Though seen the year round in apparently undiminished numbers, it passes overhead in great flocks, often mingled with migrating Broad-winged and, especially, Swainson's Hawks. The flocks move high in the air in the same direction as the hawks, leisurely flapping when not sailing, in formations that do not deviate from the line of flight. I have seen Turkey Vultures migrating from about the middle of January onward and in great concentrations in February, considerably earlier than the main hawk flight. The race *teter*, which has been taken in Panama and farther south, almost surely makes up part, if not most, of the flocks. Possibly the race *septentrionalis* of eastern North America is represented among these migrants.

FAMILY ACCIPITRIDAE

[*Elanus leucurus* (Vieillot)

WHITE-TAILED KITE

RANGE: Breeds locally across southern United States to southeastern Mexico, possibly south into Central America, and in southern South America; wintering birds move southward and northward, respectively.

The White-tailed Kite was listed for Costa Rica by Zeledón (1887) without a shred of supporting evidence. I saw it twice under circumstances that led me to believe that it may be present both as a transient and a resident. On September 1, 1958, in the forested north-eastern lowlands, I observed a circling group of about a dozen migrating individuals, both adults and immatures. On April 6 and 7, 1962, in the Río Frío region, I saw at least two, possibly three, different birds. They did not appear to be migrating, hence could conceivably have been winter visitants or possibly residents. Some people native to the area evidently know the bird quite well, and one well-informed person claimed that it was regular in the San Carlos region to the east.

The birds at Río Frío were hunting over open fields in the usual hovering manner of the species. Hanging in the air, they kept their heads and tails depressed from the horizontal and their open-toed legs extended

straight down. From time to time they exhibited a controlled falling, with the wings raised in a V. One of the birds took the time to make passes at a perched Harris' Hawk.]

***Elanoides forficatus* (Linnaeus)**

SWALLOW-TAILED KITE

RANGE: Southeastern United States to Bolivia and northern Argentina.

[***Elanoides forficatus forficatus* (Linnaeus)**

RANGE: Breeds from southeastern United States to Guatemala; recorded locally south to Ecuador in winter, in Cuba and Jamaica during migration.]

***Elanoides forficatus yetapa* (Vieillot)**

RANGE: Southern Mexico to northern Argentina.

The status of the Swallow-tailed Kite in Costa Rica is uncertain. The northern race, *forficatus*, though not recorded, possibly winters there and probably passes through on migration. The southern race, *yetapa*, breeds and is resident, at least in part; perhaps its numbers fluctuate seasonally. At any rate, in the early spring and latter part of summer, groups to the size of flocks migrate daily with Turkey Vultures and other hawks. Yet, in the third week of July in the southwest, the two migrating groups that I happened to see were unexpectedly traveling northward instead of toward the southeast. In general, the species is seen only occasionally in the coastal lowlands, either singly in winter or in migrating groups. Birds that appear to be resident tend to prefer the wetter portions of the forested subtropical and upper tropical belts along the Caribbean versant of the central highlands and in the southwestern General-Térraba region, though I found the species common enough in the hilly lowlands at the head of the Golfo Dulce. Northward from the General region it is unrecorded in the Pacific lowlands, including all the subhumid northwest; I found it only once along the northwestern divide.

The species is sometimes encountered nesting in a semi-isolated tall tree near woodland or sitting about on lofty, unfoliated, moss-hung branches of tall trees in mountain forest. As a rule, however, it is seen, singly or

in groups, sailing and banking swallow-like in the semi-open, from time to time shearing the usually spread, forked tail. Flying and wheeling about, this small-billed kite habitually makes brushing swoops against the tops of trees and shrubs in search of animal prey and sometimes loops back unexpectedly for a second try. Once I saw a bird dive at a small hawk and be worried, in turn, by a flycatcher. Its graceful flapping flight is beautiful to see, but the bird does not soar. It may be abroad at any time of the day. Its call is a rapid, sort of tinkling "twees twees," and so on, or "kereé kereé," and so on, which should not be confused with the similar outbreak of sound from the large swift, *Streptoprocne zonaris*.

***Leptodon cayanensis* (Latham)**

GRAY-HEADED KITE

RANGE: Northeastern Mexico to Bolivia and northern Argentina.

The Gray-headed Kite is distributed over most of the country, primarily at the lower elevations, from both coasts into portions of the subtropical belt, especially along the Pacific face of the Guanacaste Cordillera and the eastern side of the central highlands. On the whole it seems to prefer the humid-forested life zones, but it is also known from several localities in the dry-forested northwest, from the Tempisque basin to Las Cañas, where it was probably collected in stands of edaphically moist woods. As with most hawks, it is met only from time to time, generally along the borders of forest, in patches of woodland, or in trees in the semi-open beside woodland. It is usually seen singly, also in two's.

For the most part it occurs high up in the concealment of foliated branches, among which it moves about and makes regular stops to look for prey before sailing slowly to another tree. In such a situation I have seen it feed leisurely on a small snake, still alive and squirming, from which it was biting pieces of flesh. Of slow flight, the bird alternates glides and a few flaps. It soars high above the semi-open, possibly moving from one hunting ground to another; it does not seem to be sedentary at a particular site. Soaring, the bird sometimes raises its wings to form a V and vibrates them rapidly. It makes at least three distinct cries: a rather rapidly repeated single note like that of *Trogon massena*, a

catlike "myowr," and a call reminiscent of that of a hawk-eagle (*Spizaetus*).

Chondrohierax uncinatus (Temminck)

HOOK-BILLED KITE

RANGE: Mexico to Bolivia and northern Argentina; Cuba; Grenada.

Chondrohierax uncinatus uncinatus (Temminck)

RANGE: Western Mexico to Bolivia and northern Argentina.

This hawk is evidently rare in Costa Rica. It is known in all from four or five widely separated areas: the central plateau, its humid eastern edge, and the northeastern foothills of the Talamanca Cordillera; the head of the Gulf of Nicoya; the lower Térraba Valley; and the Río Frío region. Judged by the few records and my own limited observations, it is perhaps least uncommon in the lower subtropical belt in the central and east-central parts of the country, yet it might be expected almost anywhere. At the head of the Gulf of Nicoya, in the Río Frío region, and the Térraba Valley it seems to frequent riverside gallery forest.

I met it only three times. The first two times I saw a brown-phased bird perched sluggishly in a tree in a coffee plantation; the third time, a gray-phased bird in trees lining the Río Frío. In general it would appear to be in Costa Rica a nonforest species that frequents open woodland, tree plantations, and cutover areas with rather densely foliated low trees; sometimes it enters forest.

Harpagus bidentatus (Latham)

DOUBLE-TOOTHED HAWK

RANGE: Southern Mexico to Bolivia and southern Brazil.

Harpagus bidentatus fasciatus Lawrence

RANGE: Southern Mexico to western Ecuador.

The rather uncommon Double-toothed Hawk is distributed country-wide exclusive of the Tropical Dry Forest. On the Caribbean side it ranges from the lowlands into the upper subtropical belt, reaching the Pacific side of the central plateau along its southern edge and overlapping the northwestern divide. In the southwest, where it is perhaps not at all rare, I met it at three localities in the

upper tropical and lower subtropical belts from the Térraba region to the Panama border; I did not happen to find it in the lowlands.

This small hawk evidently prefers the humid life zones. It is a woodland species in that it occurs at forest borders, enters somewhat into virgin forest, and frequents trees in the semi-open close to forest. It perches at all heights in the trees. Generally it is seen singly, sometimes in what appear to be mated pairs as the two members call back and forth to each other. Its hunting methods seem to be varied. The bird may sit quietly inside cover, like an *Accipiter* or *Micrastur*, or launch itself from an unobstructed branch at the edge of the semi-open, like a dashing *Falco*; I have not seen it soar. It eats by picking its prey to pieces, not bolting it whole.

Its call consists of several deliberately repeated "tsip"'s, like those of the tiny flycatcher *Todirostrum cinereum*, but given at a slower pace than those of the latter and not in sets. From the immature I have heard a similar but higher-pitched series of shrill "pee-yip"'s or "pseeyp"'s.

Ictinia mississippiensis (Wilson)

MISSISSIPPI KITE

RANGE: Breeds in south-central and south-eastern United States; winters from Florida and southern Texas to Guatemala; recorded in Costa Rica and Paraguay.

The only Costa Rican specimen, an immature female (M.N.C.R. No. 8358), was collected October 18, 1893, at the Río María Aguilar near San José on the central plateau. I observed the species only once, passing in fall migration over the northeastern lowlands. The date was September 24, 1961, when Broad-winged Hawks were already migrating in large flocks, though somewhat before their greatest abundance, and earlier than the appearance of transient Swainson's Hawks in large numbers. The closely related but easily distinguishable Plumbeous Kite migrates several weeks earlier. At least two small groups of Mississippi Kites, one of eight and the other of three individuals, were following the same southeasterly route as the Broad-wings. From the first group I heard several of their whistles. I do not recall hearing other species of migrating hawks utter

their calls. This kite is probably a regular transient in the spring as well as in the fall. Possibly a few wintering individuals will yet be found.

***Ictinia plumbea* (Gmelin)**

PLUMBEOUS KITE

RANGE: Eastern Mexico to Bolivia and northern Argentina.

The status of the Plumbeous Kite in Costa Rica is that of a passage migrant and resident. It is seen regularly in aerial transience northward in February and southward in the latter part of July and August, usually sailing steadily in a constant direction. It migrates at about the same time as and often in company with Swallow-tailed Kites, though in much smaller numbers. Also, specimens have been taken in March, April, and June; one of these (C.N.H.M. No. 13629) was labeled a breeding female by Cherrie. In general, the species is seen seldom or irregularly outside migration. All reports are from the tropical belt on the Caribbean slope, with the exception of two birds reported seen May 19 and 21, 1962, at lower subtropical and upper tropical elevations in the Coto Brus district, by Richard Ryan and Ned Boyajian.

I have seen nonmigrating birds only in the Sarapiquí region of the wet-forested northeastern sector, particularly at the ridges and foothills rising toward the northern side of the Cordillera Central. These were single adults either perched or in the air. For perching the bird seems to prefer selectively logged woodland or clearings with some tall trees beside forest. Soaring, it is usually seen over the semi-open, and it probably patrols an extensive hunting territory. I have heard it utter, seldom, a "tih weé" like that of the flycatcher *Legatus*, sometimes a three-syllable "dih deedeé," and a little trill.

***Rostrhamus sociabilis* (Vieillot)**

EVERGLADE KITE

RANGE: Florida and eastern Mexico locally to Bolivia and Argentina; Cuba.

***Rostrhamus sociabilis sociabilis* (Vieillot)**

RANGE: Nicaragua to Bolivia and east-central Argentina.

The Everglade Kite is distributed locally through most of the tropical and subtropical

regions of America. In Costa Rica it has not been found outside a limited area covering the Tempisque basin in lowland Guanacaste, mostly at the head of the Gulf of Nicoya and in the upper Nicoya Peninsula, where it occurs in fair numbers. It is not known from the apparently suitable Río Frío region despite the presence there of the habitat-sharing Limpkin. Both species are largely if not entirely restricted to grassy marshes and reedy lake margins in association with certain freshwater snails upon which they seem to feed almost exclusively. Remarkably tame and highly specialized, the species is susceptible to quick extermination either by guns or through alteration of the habitat.

This medium-sized kite has an overly long, slender hook at the tip of its beak and short weak legs. Few adult males will be seen; the majority of the variably plumaged individuals have a nondescript appearance. A sluggish bird that sits about on stubs, low limbs, or brush, it returns to one of several favorite perches. It is colonial in the sense that environmental exigencies restrict it to particular sites. Thus, several individuals to a dozen or more may keep together when at rest or in the air. In the air they float individually up and down, as if at random, and often hover by adjusting wings and tail like ailerons and a rudder.

The call, difficult to transcribe, sounds like the bleat of a goat, a guttural rasp, or a very dry, creaking rattle, as though a series of "dzě"'s were run together. Curiously, the flycatcher *Muscivora tyrannus* has a call almost exactly like it. The chatter of the oriole *Icterus galbula*, if dried and lightened, would resemble it also.

***Accipiter bicolor* (Vieillot)**

BICOLORED HAWK

RANGE: Southern Mexico to Tierra del Fuego.

***Accipiter bicolor bicolor* (Vieillot)**

RANGE: Yucatan to Peru and Amazonia.

The Bicolored Hawk inhabits the humid life zones on both slopes, primarily the lowlands but also a good portion of the subtropical belt the length of the cordilleras of the country. There is a record for the central plateau, an area from which it is now mostly

absent, none from the southeast, where the bird should be present. It does not enter the dry-forested northwestern lowlands, but does occur on the neighboring humid slopes of the continental divide.

Though seldom seen inside virgin forest, it is nevertheless a woodland species that frequents open or thinned woods and the periphery of forest, usually the thickety portions or more advanced second growth. In proportions and general appearance as well as habits it brings to mind the forest falcon *Micrastur ruficollis*. It is not met often, in my experience, and is to be seen singly, generally fairly low in the trees. Usually the bird sits about for rather lengthy periods, but it is actually highly alert. Flight is quiet and low through the woodland understory. It makes an unbird-like, rather long, somewhat tapering snarl or throat-clearing growl and an accipiter- or woodpecker-like staccato.

***Accipiter cooperii* (Bonaparte)**

COOPER'S HAWK

RANGE: Breeds in North America south to northern Mexico; winters to Guatemala; recorded in Costa Rica and Colombia.

The wintering Cooper's Hawk becomes uncommon to rare south of Guatemala. The only Costa Rican report, nearly a century old, is that by Lawrence (1868-1870, p. 134) of a bird collected by Juan Cooper at El Mojón on the outskirts of San José.

***Accipiter superciliosus* (Linnaeus)**

TINY HAWK

RANGE: Nicaragua to Peru and extreme northeastern Argentina.

***Accipiter superciliosus fontanierii* Bonaparte**

RANGE: Nicaragua to western Ecuador.

This very uncommon miniature hawk is largely a tropical-belt species known primarily from the Caribbean slope. It has been recorded previously from only four localities, and I met it at another three, mostly in the northeastern sector, from the lowlands to the lower limits of the contiguous wet-forested subtropical belt. In addition, I found it once on the Pacific side, where it seems to be rare, in the wet-forested Golfo Dulce lowlands. Probably it is scattered throughout the humid life zones at low elevations on both

slopes. It is not recorded from all the northwestern quadrant, including the Tropical Dry Forest, the continental divide, the northwestern Caribbean slope, and the entire central plateau region.

Though I have met the Tiny Hawk a little inside virgin woods, I do not consider it a forest inhabitant. Rather, it frequents the overgrown borders of forest and tall thickety second growth at woodland openings. The denseness of the habitat makes an attempt at estimating its abundance difficult. Generally it occurs fairly low, from a few yards to perhaps 25 feet up; occasionally it perches on an exposed high branch of a semi-isolated tree close to woodland. Apparently the hunting bird sits in concealment and then makes a sudden rush through the vegetation in pursuit of prey, usually small birds. Its small size would appear to enable this *Accipiter* to hunt in the dense growth it frequents. I have seen it only singly.

***Accipiter striatus* Vieillot**

SHARP-SHINNED HAWK

RANGE: Breeds in North America, Mexico, and West Indies; winters to western Panama.

***Accipiter striatus velox* (Wilson)**

RANGE: Breeds in North America; winters to western Panama.

The Sharp-shinned Hawk, a visitant, arrives by the second week of October, or probably earlier, and remains until mid-March, or probably later. Most records date from the latter part of November through most of February. An uncommon bird, it seems to winter largely at subtropical elevations in the central part of the country: the central plateau primarily, also subtropical ridges and foothills in Cartago Province to the east, and there is a record from the north slope of the Cordillera Central. I found it also at the Arenal gap in the northwestern divide and at two localities in the upper tropical belt in the Térraba region. Otherwise the species remains unknown from the tropical belt for the length of both slopes.

As this small hawk is solitary in its habits, usually perches quietly on foliated branches, and is at best locally uncommon, it is seen only occasionally; probably it has a broader and denser distribution than is indicated. A

nonforest species, it frequents semi-open areas with scattered trees and scrubby or second-growth vegetation, such as agricultural and pasture lands, plantations, and clearings. Here its day-to-day habits seem not to differ from those exhibited in North America. For example, I have seen it boldly enter the patio of the Museo Nacional in San José in pursuit of sparrows (*Zonotrichia capensis*).

***Buteo albicaudatus* Vieillot**

WHITE-TAILED HAWK

RANGE: Southwestern United States to northern South America, also in southern South America.

***Buteo albicaudatus hypospodius* Gurney**

RANGE: Southwestern United States to Colombia and Venezuela.

The White-tailed Hawk is resident in Costa Rica where, as with a number of other kinds of hawks, little is known about its abundance and distribution. Taken previously at three localities on the central plateau and at Cerro Santa María in the Guanacaste Cordillera, and last reported at the turn of the century, it was presumed resident in the interior highlands. In my experience the species is centered in the Pacific northwest, where it can be met from time to time in the dry-forested lowlands and the contiguous moist-forested subtropical strip along the Guanacaste Cordillera. I have a single observation for the southwest in the savannas near Buenos Aires, and occasionally I saw it sailing low over forested subtropical ridges bordering the Reventazón drainage in Cartago Province.

It is an open-country species which, in the northwest, I found on the mainland side of the Gulf of Nicoya, in the upper Nicoya Peninsula, and at Miravalles and Cerro Santa María along the continental divide. In the Nicoya Peninsula I found a pair, in late December, completing a nest in a tall tree standing alone on a knoll in a field. But only in the region of the hilly, scrubby ranch lands at Hacienda Miravalles, in sight of the volcano and on its slopes, did I find it regularly. There it could usually be seen nearly motionless in the air, buoyed by the prevalent strong winds, occasionally flapping to maintain its fixed position, then stooping out

of sight. I have also seen it on branches and on the ground, always (in the northwest) in open or semi-open country. In beating flight it flaps and sails rather slowly or leisurely from one stopping place to another. Its cry is a hoarse "ack keháck keháck."

***Buteo jamaicensis* (Gmelin)**

RED-TAILED HAWK

RANGE: North America to western Panama; West Indies.

***Buteo jamaicensis calurus* (Cassin)**

RANGE: Breeds in western North America; winters to western Panama.

***Buteo jamaicensis costaricensis* Ridgway**

RANGE: Costa Rica and western Panama.

The migratory *calurus* is represented by two specimens (A.M.N.H. Nos. 389155, 470674) which Eugene Eisenmann brought to my attention. They were collected, respectively, in November and December on Turrialba Volcano and the central plateau. The native *costaricensis* is the race usually taken and probably seen. A bird of the mountains, it is found as a rule from the middle altitudes to above timber line. It is not uncommon, for a hawk, in the central highlands (including the Dota Mountains), and I have seen it above tree line on the Talamanca Cordillera, where its frequency is not known. At subtropical elevations it occurs occasionally along the Caribbean ridges and slopes approaching the central highlands, and I saw it a few times at the base of Miravalles Volcano in the Pacific northwest. A report from the dry-forested lowlands at the head of the Gulf of Nicoya is not supported by a specimen, but I observed it once at 1100 feet in the far southwest.

A soaring raptor that prefers open and semi-open areas, it does not occur in forest but does frequent stands of trees. I have seen it only singly. Its very hoarse cry brings to mind that of *Leucopternis albicollis* rather than that of its conspecific in northeastern United States.

***Buteo albonotatus* Kaup**

ZONE-TAILED HAWK

RANGE: Southwestern United States to Colombia and Surinam.

***Buteo albonotatus albonotatus* Kaup**

RANGE: Southwestern United States to Panama.

The Costa Rican status of the Zone-tailed Hawk is uncertain. The species is represented probably by residents and migrants, but these seem to be subspecifically inseparable, nor do I know of banding recoveries or breeding data. In my experience, this very uncommon hawk is primarily an inhabitant of the northern half of the Pacific side of the country, from the dry-forested lowlands around the Gulf of Nicoya to northern Guanacaste and the lower subtropical belt along the northwestern divide. There I have found it in January, April, August, September, October, and November. The only bird that I saw on the central plateau I assumed to be a migrant. Several old reports, under the name *Buteo fuliginosus*, from the plateau region and the central highlands are mostly referable to *swainsoni* and *brachyurus*. On the Caribbean side, for which there seem to be no previous records, I have a lone observation of an individual that was almost surely a passage migrant at the end of October in the extreme southeast beside the coast.

At its center of occurrence in the Pacific northwest it is an open-country species that frequents the scrubby ranch lands and the vicinity of thicket-bordered streams, many of which are seasonally dry. It is generally seen in flight, rather low in open situations, quartering in the manner of a Turkey Vulture, to which it bears some resemblance in general appearance, proportions, and, especially, the dihedral of the wings.

Buteo swainsoni* Bonaparte*SWAINSON'S HAWK**

RANGE: Breeds in western North America; winters chiefly in South America to south-central Argentina.

Swainson's Hawk is almost exclusively a passage migrant that occurs in great flocks in October and November and again from March to early May. Its route at both times of year includes all the Caribbean slope and the central highlands. I have seen flocks skirting the western side of the Guanacaste Cordillera in the spring, but there seem to be no records anywhere on the Pacific slope in the fall; in the southwest it has been reported

only during the spring (Skutch, 1945, p. 88), when it is abundant. Cherrie [1892 (1891-1892), vol. 2, p. 328] saw the bird occasionally during the winter on the central plateau, but, with the possible exception of a specimen taken November 25, there seems to be no winter record.

The migrating flocks vary in size from a few straggling individuals to hundreds or even thousands. In general the birds follow a northwest-southeast direction, which is the same as that of the interior mountain ranges and both coastlines. They often travel with Broad-winged Hawks and Turkey Vultures, accompanied by a scattering of other falconiforms. From time to time the flocks mill about as individuals rise in clockwise or counterclockwise circles to gain altitude, not only over ridges but also over river junctions in the flat lowlands. At nightfall or the approach of a storm the birds settle on trees, when they are distinguished by their eye-pleasing proportions and unhurried graceful flapping. They also come to rest on the ground in open places, as in the southwestern savannas and the Río Frío region. In the latter area I have seen scores of scattered individuals spending the day afoot and feeding on grasshoppers. Rarely during migration does one meet a single individual, either perched or in the air.

Buteo platypterus* (Vieillot)*BROAD-WINGED HAWK**

RANGE: Breeds in North America and West Indies; winters to Peru and Brazil.

***Buteo platypterus platypterus* (Vieillot)**

RANGE: Breeds in North America; winters to Peru and Brazil.

The Broad-winged Hawk, even more striking than Swainson's, is seen in great flocks that migrate high in the air through a chain of interlocking circles. Wintering from October to April, it is one of the few abundantly seen hawks in Costa Rica. It is found in all sorts of situations that have trees on which to perch, with the exception of the forest interior, the length of both slopes from sea level to altitudes above those of the central plateau. A solitary bird, keeping apart from others of its kind in most semi-open areas, it apparently stakes out ownership to a feed-

ing territory. It is rather sluggish in behavior and may allow a close approach before taking flight. Then, rising continually, it may circle once or twice in the vicinity of the observer before sailing away; it returns later to the same site to which it is evidently attached.

It alternates flaps and glides, and it soars regularly. It seldom settles atop tall trees, generally preferring perches at or below medium heights. Though I have seen it dive at a hawk-eagle (*Spizaetus*), this smallish hawk does not seem to molest birds. Rather, I have seen it feeding on crabs, lizards, and snakes. Its cry, a prolonged sharp whistle, has an introductory catch usually heard only at close range. The whistle is somewhat like that of *Buteogallus urubitinga*.

***Buteo magnirostris* (Gmelin)**

ROADSIDE HAWK

RANGE: Mexico to Bolivia and north-central Argentina.

***Buteo magnirostris argutus* (Peters and Griscom)**

RANGE: Honduras to northwestern Panama.

***Buteo magnirostris petulans* van Rossem**

RANGE: Western Costa Rica to central Panama.

The Caribbean *argutus* is distributed from the lowlands westward across the plateau region and through gaps in the Guanacaste Cordillera to the northwestern dry-forested lowlands. The Pacific *petulans*, a southwestern form, occurs southward from the head of the Gulf of Nicoya. The two races overlap and intergrade where their ranges meet. On the Caribbean side the species is most abundant between the flat lowlands and the central plateau; on the Pacific side it is largely confined to the tropical belt. It may be met almost anywhere in its range, especially in semi-open areas but also in patches of woodland, almost always singly. In extensively forested regions, however, even where suitable habitat is present, the bird is uncommon or lacking. All in all it is probably the most abundant native hawk in the country.

In general appearance the Roadside Hawk resembles the bulkier Broad-winged. In the air, too, its size, proportions, and manner of flight, alternating flaps and a sail, are almost

identical to those of the Broad-winged and Gray Hawks. The ends of its wings, however, are blunt or rounded, and the tips of the primaries are usually spread apart; also, the Roadside does not spend so much time circling in the air. It generally selects a branch, a stub, or a post rather than the tops of tall trees on which to perch. It is not shy and often permits a close approach before flying to another perch not far distant. Often its angry cry alone reveals a nearby individual. In woodland, too, it perches not far above the ground, but here its habits are different, because the bird seems to experience no difficulty in flying through the vegetation in the manner of a true forest hawk. I have not heard it call when in the woods.

Its cry is a jaylike "eé-errr," sounding petulant or annoyed, with the second syllable long and tapering. The bird also makes a squeaky "ker-ker-ker" or "kek-kek-kek," and so on, almost identical to the similar cry of the Gray Hawk.

***Buteo brachyurus* Vieillot**

SHORT-TAILED HAWK

RANGE: Florida and Mexico to Bolivia and northwestern and extreme northeastern Argentina.

The Costa Rican status of the Short-tailed Hawk parallels that of the Zone-tailed. Though breeding and banding data are lacking, the species is represented probably by resident and wintering populations. The several records for June and July almost surely apply to native birds. In addition, there are reports and my own sight observations for August, September, November, December, January, and February. During migration, especially in the very early spring and late summer, I have seen lone, black-phased individuals traveling with Swallow-tailed and Plumbeous Kites. Later in the fall, at the time of the great hawk migration, I uncertainly identified small groups of white-phased individuals high in the air.

The species is known principally from three regions: the central highlands, the vicinity of Lake Arenal at the break in the northwestern divide, and the upper Térraba Valley in the southwest. I found it also during the dry season at the head of the Gulf of Nicoya and at migration time in the wet-

forested northeastern lowlands. Nearly all previous records pertain to the central plateau and the Cordillera Central. I met the species more or less regularly in the southwest, where the birds were mostly black-phased, and commonly only at Lake Arenal, where it is represented mostly if not entirely by white-phased individuals. It is to be seen singly, sometimes in two's, usually in the air. It sails and flaps as do others of its genus, but its silhouette is rather like that of a kite (*Ictinia*). This small *Buteo*, in my experience, is considerably more spirited and wary, say, than the congeneric Broad-winged and Roadside Hawks. I have seen it make *Falco*-like swoops at thrush-sized birds on the ground. Its cry is a drawn-out nasal "keeeer" that loses intensity along the way.

***Buteo nitidus* (Latham)**

GRAY HAWK

RANGE: Southwestern United States to Bolivia and northern Argentina.

Buteo nitidus micrus (Miller and Griscom)

RANGE: Southern Mexico to northwestern Costa Rica.

Buteo nitidus blakei Hellmayr and Conover

RANGE: Southwestern Costa Rica to northern Colombia.

The Gray Hawk is a Pacific species, represented in Costa Rica most abundantly by *micrus*, which is virtually confined to the Tropical Dry Forest and the neighboring lower subtropical slopes of the continental divide. Its headquarters are the Tempisque basin and the lowlands bordering the Gulf of Nicoya. In diminishing numbers it reaches the western approach to the central plateau; apparently an occasional individual turns up in the San Carlos region on the north-central Caribbean slope. The southwestern *blakei*, known thus far exclusively from the Térraba region southward, occurs, sporadically, only in the tropical belt.

The species does not enter forest, but is found in greatest numbers in open country, including pastures with trees and woodland edges, and it is often seen circling over forested as well as deforested country. Here in Costa Rica it does not appear to act aggressively toward other birds, although its style

of coloration is that generally associated with some of the ferocious bird hawks. Perched, it appears to be, for a hawk, almost appealingly innocent, perhaps because of its small bill and liquid large black eyes; it can often be approached quite closely. Its ordinary rather slow flight consists of sails alternating with series of flaps, the usual *Buteo* type.

Its common cry is a rather musical "peéyerr," the second syllable of which is long-drawn-out and tapered downward. It may be shortened to a mewing whistle, repeated several times and changing into a double-stopped "ooeér." The call, though as nasal as that of a flycatcher, is clear and may remind the listener of that of the Black Hawk-Eagle. An "ooeér" given singly, out of context, sounds dovelike. An angry "ker ker ker," and so on, is similar to that of the Roadside Hawk.

***Parabuteo unicinctus* (Temminck)**

HARRIS' HAWK

RANGE: Southwestern United States to Chile and south-central Argentina.

Parabuteo unicinctus harrisi (Audubon)

RANGE: Southern United States to western Ecuador.

The uncommon and locally distributed Harris' Hawk is nearly restricted to the northwestern quadrant of the country. Though primarily an inhabitant of the Tropical Dry Forest, it is apparently largely confined to the Barranca-Puntarenas district, the shores of the Gulf of Nicoya, and the Tempisque basin. A secondary center is the Río Frío region of the Caribbean northwest. There are no breeding data, yet the bird is almost surely resident, at least in part. A specimen taken in December at San José and a sight report in November from the Caribbean coast north of Puerto Limón (Carriker, 1910, p. 454) could well apply to migrants. Otherwise there are no Caribbean records and none from the southern half of the country.

An open-country species, it frequents agricultural and ranch lands scattered with tall trees and small wooded stands in the wetter parts of the subhumid northwest and at the Río Frío. This large sluggish hawk flaps and sails like a *Buteo* and secures its prey primarily by dropping to the ground in grassy

openings. I have seen it singly, occasionally in two's. It makes a heron-like bass croak.

***Leucopternis albicollis* (Latham)**

WHITE SNAKE HAWK

RANGE: Southern Mexico to eastern Bolivia, the Guianas, and Brazil.

***Leucopternis albicollis costaricensis* Sclater**

RANGE: Honduras to Colombia.

Except for the Tropical Dry Forest, the White Snake Hawk occurs over most of the country from sea level into the subtropical belt, locally to its upper limits. It is common only downward from the lower subtropical belt on the Caribbean side and also along both slopes of the Guanacaste Cordillera. It is met much less frequently in the southwest, where it is to be seen occasionally above the tropical belt and is common only southward from the Térraba region. Apparently this hawk prefers humid regions of more or less evenly distributed rainfall to those with a well-marked dry season. It inhabits wooded country, including openings in forest, thinned woodland, and clearings with trees. It may occur within the periphery of forest, but only once did I find it well inside solid forest, at a timbered swamp into which a fair amount of light entered. It often selects a semi-isolated tall tree as a favorite lookout.

Almost always it is seen singly when perched, either singly or in two's or three's in the air. Its flight is that of a *Buteo*, slow, rather heavy, alternating flaps and a glide. This white hawk is much given to soaring in circles at mid-morning, when its very broad-winged and relatively short- and broad-tailed silhouette is similar to that of the Common Black Hawk. One of the few commonly seen hawks of Costa Rica, cruising and wheeling on apparently motionless wings, this white species makes an unforgettable sight against a green backdrop. Its food seems to consist mainly of snakes and probably includes lizards. Apparently it has a marked preference for coral snakes, which it swallows whole. Indeed, the bird may show a strange lack of interest in nonreptilian prey, for example, a rat already secured and grasped in its talons. As with other snake-eating hawks, this species is rather sluggish and often permits the observer a close approach.

Its usual cry is an unclear whistle or scream so hoarse that it sounds asthmatic. It is given freely by soaring birds, thus attracting attention to themselves, rarely by perched ones. Only the native Red-tailed Hawk utters a similar cry.

***Leucopternis semiplumbea* Lawrence**

SEMIPLUMBEOUS HAWK

RANGE: Honduras to northwestern Ecuador.

The Semiplumbeous Hawk is a Caribbean species found primarily in the wetter parts of the tropical belt and on rare occasions in the lower subtropical belt. It is known chiefly from the foothill portions of the northeastern and also the very humid, extreme southeastern sectors. Occurring almost exclusively in heavily forested areas, it is, for a hawk, fairly common locally. A true inhabitant of virgin forest, it also frequents the forest border and the adjacent semi-open, such as tree plantations or the trees lining a nearby river bank.

It is found singly and also, during most or perhaps all of the year, in two's, and it seems to be sedentary at a site. It perches from several yards up to the tops of the tallest trees, but is usually met sitting quietly, not at all shy, at or below medium heights. I have seen it attracted to army ants and the attendant birds, when it lit on a limb in open view several yards above my head. Twitching its tail slowly from side to side and staring directly downward, it brought to mind an owl or a Laughing Falcon. After a while it flew to another tree some 50 yards away. The only time I saw a bird that was actually feeding, it was pulling pieces from a lizard. Possibly this species preys mostly on reptiles, as the other two members of its genus in Costa Rica seem to do. Flight is usually steady and straight and consists of either a rapid beating or of flaps alternating with sails. I have not seen the bird circle or soar. Apparently it nests inside forest, where it is to be heard regularly and where I have found it nest building about 80 feet up in the crown of a medium-sized tree at the end of January.

Its call, a *Spizaetus*-like "ooeé ooeé ooeé," but "thinner" and with a certain sense of urgency, is not dissimilar to that of the Wood Duck (*Aix sponsa*) of North America;

it may be preceded by an "oo·oó." Given frequently during the day, it advertises the presence of the bird which might otherwise pass unnoticed. An individual that I saw calling had its wing tips below its tail and its rump feathers bunched into a mound; it was answered by a companion, perhaps its mate.

***Leucopternis princeps* Sclater**

PRINCE HAWK

RANGE: Costa Rica to Ecuador.

***Leucopternis princeps princeps* Sclater**

RANGE: Costa Rica and western Panama.

The Prince Hawk is primarily a Caribbean species of the middle altitudes, mostly the upper half or two-thirds of the subtropical belt and, to a lesser extent, the lower montane belt. It is not uncommon along the Caribbean-facing slopes of the Cordillera Central and the approaches to the northern end of the Talamanca Cordillera, and it has been recorded from the mountains immediately south of the central plateau. It is not known from the southeast, where it probably occurs, or the northwestern divide, from which it is probably absent. I have two observations, perhaps of the same individual, from the very humid Sarapiquí lowlands, to which the bird evidently wanders infrequently. In addition, I found it at two subtropical localities on the Pacific slope, both on the Talamanca Cordillera, overlooking the Térraba and Coto Brus valleys, respectively.

This fine hawk inhabits heavily forested mountainous country, usually under cloud-forest conditions, but apparently does not enter deeply into forest. It is seen singly and, in the air, also in two's and three's, where its broad-winged, short-tailed proportions bring to mind those of the congeneric *albicollis*, which also soars habitually. It is a still hunter that feeds perhaps largely on reptiles; at any rate, the only stomach I examined contained a snake. In life, the yellow of the cere and upper mandible seems to cover the entire beak, except the hook, in snoutlike fashion.

Its *Spizaetus*-like call consists of an unclear "wheéyoor wheéyoor" followed by a rapid series of "weep"'s, "dit"'s, "yip"'s, or "püp"'s of decreasing intensity. Sometimes the bird simply accelerates a number of

hoarse "whee"'s. The bird is usually noisy in the air, and on one occasion I saw a calling individual make diving loops as does the Ornate Hawk-Eagle.

***Busarellus nigricollis* (Latham)**

FISHING BUZZARD

RANGE: Southern Mexico to Bolivia and northern Argentina.

***Busarellus nigricollis nigricollis* (Latham)**

RANGE: Southern Mexico to Bolivia and Brazil.

The Fishing Buzzard, or Black-collared Hawk, is known from only two lowland areas in the northwestern quadrant of the country: the Tropical Dry Forest in Guanacaste, northward from the head of the Gulf of Nicoya through the Tempisque basin as far as Liberia, and the transcordilleran Río Frio region on the Caribbean slope. Its distribution coincides with that of its preferred habitat, primarily fresh-water marshes and flooded fields in open country or small bodies of water within patches of woodland. I have seen it usually singly, either flying at treetop height in swampy country or perched on a limb at or below medium heights at the edge of a pond, lagoon, or stagnant watercourse; occasionally I found it in two's.

This striking hawk has a mild look, perhaps because of its large black eye and lack of a contrastingly colored cere. A sluggish bird, it can as a rule be approached rather closely when alone. Yet I found it wary when in two's, probably a mated pair, as one or the other flew to a high perch and noisily made the other marsh inhabitants aware of the intruder. Its harsh cry varies from a hoarse squeal, beginning with a little chink, to a heavy, heron-like croak not so deep or bubbly as that of the Crested Caracara. Despite a number of encounters and long waits, I did not observe its fishing habits, which were described so well by Dickey and van Rossem (1938, p. 126).

***Buteogallus anthracinus* (Deppe)**

COMMON BLACK HAWK

RANGE: Southwestern United States to extreme northern Peru and Venezuela; Cuba and Lesser Antilles.

Buteogallus anthracinus anthracinus (Deppe)

RANGE: Southwestern United States to northern Colombia.

Buteogallus anthracinus subtilis

(Thayer and Bangs)

RANGE: Pacific slope, southern Mexico to Ecuador.

The two Costa Rican races of Common Black Hawk are very similar in appearance and indistinguishable in voice, but differ in habitat and general habits. The larger form, *anthracinus*, has a country-wide distribution, exclusive of the Pacific shore line, from the tropical belt, in which it is most common, to, in smaller numbers, the lower subtropical belt. In the northwest it is common in the Guanacaste lagoon country and frequents gallery forest and stands of edaphically moist woodland. Everywhere else it is found most often at wooded river and stream banks, seldom if ever deep in solid woodland; in extensively forested regions it is distinctly uncommon or occasional. It perches well up in the trees, but apparently secures its prey on the ground. It seems to be partial to small-sized creatures that occur along the margins of watercourses, and probably it also eats carrion. In any event, I saw a bird on a river bank feeding on a large fish presumably washed ashore. Usually occurring singly or, in the air, sometimes in two's or three's, this broad-winged, short-tailed hawk is seen soaring much more often than perched.

The race *subtilis* is found only along the Pacific coast (including the well-offshore Isla del Caño), where it is restricted to and common in mangroves, beach thickets and scrub mixed with trees, and on tidal flats. It perches on trees, usually scrubby ones, and is also terrestrial; it soars more or less regularly. It feeds primarily on crabs which it obtains on the exposed flats and which it carries to a favorite perch behind the beach. It walks well in an intent, business-like manner, without any head bobbing; at a distance the standing bird resembles a black rooster. Herons and shore birds pay no attention to it.

The cry of this species, which consists of a number of rapidly "spinking" notes, reminds

me of that of the Bald Eagle (*Haliaeetus leucocephalus*) in the United States.

Buteogallus urubitinga (Gmelin)

GREAT BLACK HAWK

RANGE: Mexico to Bolivia and Argentina.

Buteogallus urubitinga ridgwayi (Gurney)

RANGE: Mexico to Panama.

Buteogallus urubitinga urubitinga (Gmelin)

RANGE: Eastern Panama to Bolivia and Argentina; recorded in Costa Rica.

For the race *urubitinga* "the only authentic record existing which can be used for proof of its ever having been taken in Costa Rica is the single specimen taken by Arcé at Bebedéro, as recorded by Salvin and Godman (*Biologia*), from which the description of the species for the *Biologia* was made" (Carraker, 1910, p. 461). All other specimens are referred to *ridgwayi*.

As noted by Carraker (1910, p. 462), the range and habits of this species agree with those of the congeneric *anthracinus*. The longer-legged *urubitinga* appears to be just as sluggish as *anthracinus*, but apparently it is not so given to soaring. Like *anthracinus*, it is relatively common in the Guanacaste lagoon country at the head of the Gulf of Nicoya and, in general, occurs mostly at wet places and along watercourses, but it seems to be a rarer bird than *anthracinus* in the Caribbean lowlands. Although the two species are superficially similar, both in the adult and immature plumages, they are distinguishable at once by their very different calls. That of *urubitinga* is a prolonged, rather even, screaming whistle, something like "ooéééééééé." Sometimes the whistle breaks toward the end or in the middle, in the latter case continuing at a higher pitch.

[Harpyhaliaetus solitarius (Tschudi)

SOLITARY EAGLE

RANGE: Mexico to Peru.

This is another of the species which, listed without comment by Zeledón (1887, p. 126), could reasonably be expected in Costa Rica. I observed it a few times, possibly the same individual, between March 10 and 21, 1955, at about 5000 feet on the brokenly forested

northwestern slope of Poás Volcano (at that time in gaseous and ashy eruption). The bird was in the air each time, sailing and banking rather low. Superficially it strongly resembled the relatively longer-tailed *Buteogallus urubitinga*, a species that I did not expect at so high an elevation. I saw it a few times, again in the air, in the latter part of July at an altitude of some 4000 feet in the Térraba region beside the Talamanca Cordillera. Finally I found it, surprisingly, in the hilly lowlands at the head of the Golfo Dulce in late March, 1962, where I saw a single individual gradually rise in soaring circles from the treetops.

Fortunately, the bird was calling freely at every encounter. Its call is completely different from that of *Buteogallus urubitinga*. At Poás I transcribed it as a "pipipipip" similar to that of the Prince Hawk; in the Térraba region, an arresting "yeep·yeep·yeep·yeep·yeep·yeep"; at Golfo Dulce, an excited, short-noted "püpüpüpüpü."]

Morphnus guianensis (Daudin)

GUIANA CRESTED EAGLE

RANGE: Honduras to Peru and extreme northeastern Argentina.

This South American hawk is extremely rare in Honduras, Nicaragua, and Costa Rica, but there are several records from Panama. The only Costa Rican specimen was collected March 21, 1904, by Carriker (1910, p. 464) at Cuabre: "The bird was shot in the heavy forest near the Sicsola River." In contrast to this record for the Caribbean lowlands, the only bird that I encountered, also close to Panama, was at about 4500 feet in the Zeledón Hump (the Cañas Gordas region) on the Pacific slope. It flushed from the ground to a low branch in the periphery of forest, then flew easily through the branches to a much higher perch partly screened from view. Its crest was not raised, and the bird made no sound.

Harpia harpyja (Linnaeus)

HARPY EAGLE

RANGE: Southern Mexico to Bolivia and northern Argentina.

The Harpy Eagle is very uncommon, or at least is seen rarely, in Costa Rica. There are several records from the region of the central

highlands, and the bird is known also from El Hogar in the northeastern lowlands near the base of the Cordillera Central. The only bird that I saw at close range was at Manila, beside the Río Pacuare in the Caribbean lowlands, not very far from El Hogar. In addition, it is well known to people living in the Térraba Valley, and it has been shot at the head of the Golfo Dulce. I have occasionally seen eagle-sized hawks, probably of this species, sailing high above forested hilly country at subtropical elevations on the east-central Caribbean slope and at lower-montane elevations on the northwestern side of Poás Volcano. The species is probably widespread in forested regions along both slopes from the lowlands into the upper middle altitudes.

The bird that I saw at Manila had the habit of flying about at canopy height beside the river and coming to rest on tall stubs and high branches. Unfortunately I neglected to take note of its cries. It might be worth while to mention two creditable eyewitness accounts. One told of an attack on a monkey screaming in fright at the close presence of the bird; the other, of a small boy who, bringing lunch to his father, became fearful of the closer and closer circlings of the bird and was compelled to hide himself in dense shrubbery.

Spizastur melanoleucus (Vieillot)

BLACK-AND-WHITE HAWK-EAGLE

RANGE: Southern Mexico to Peru and northern Argentina.

The seldom-seen Black-and-white Hawk-Eagle occurs on both slopes, from the tropical belt well into the subtropical belt and, in the central highlands, to the lower montane belt. For the dry-forested northwest there is only a single record (Esparta), in the southern portion, and I have one observation for the northwestern divide (Hacienda Miravalles). Inhabiting forested country in general, it seems to be least uncommon in the tropical belt on the Caribbean slope.

The species frequents the periphery of forest, which it apparently enters for only a short distance, and heavily shaded clearings and plantations beside woodland. In the more open situations it usually selects foliated branches high in tall trees, but does not remain there long before winging to another

stopping place; behind the woodland border it perches considerably lower. I assume it is a still hunter that drops upon prey from a branch. Flight is rather heavy and slow, and the bird flaps and sails on blunt-ended flat wings; it regularly soars over woodland and the semi-open. I have seen this hawk-eagle passed at by jays (*Psilorhinus*) when perched and by a Bat Falcon when in the air.

The white face has an odd, masklike look due to its "mascara"-rimmed eyes, which seem to be directed forward. The face appears small in the "swollen" head, angular in back because of the pointed black crest, set on a thick columnar neck. The feathered legs give the bird a flagged eagle-like appearance. Despite several encounters I did not hear this species call.

***Spizaetus ornatus* (Daudin)**

ORNATE HAWK-EAGLE

RANGE: Southern Mexico to Peru and northwestern and extreme northeastern Argentina.

***Spizaetus ornatus vicarius* Friedmann**

RANGE: Southern Mexico to Ecuador (possibly Peru).

The Ornate Hawk-Eagle is found throughout the humid-forested life zones from the tropical belt well into the lower montane belt. In general it seems to be more common along the Caribbean slope than the Pacific; it is not recorded from the southeastern sector in which it unquestionably occurs. On the Pacific side it has been reported once from the head of the Gulf of Nicoya in the Tropical Dry Forest, and it occurs sparingly along the Guanacaste Cordillera; in the southwest, it is present in fair numbers in the Térraba-Golfo Dulce region. Though recorded previously from the central plateau, it is now scarce or lacking there.

This spectacular bird of prey frequents the more heavily forested areas, where it is to be seen in the air fairly often or, at certain times and places, almost daily. A woodland species, it occurs mostly along the periphery of forest, which it does not penetrate deeply except perhaps along natural breaks. In my experience it avoids perching in the semi-open. The perched bird seemingly has its legs set very far forward, almost under the chest,

thus giving the impression of poised readiness. The position of the black crest hints at the temper of the bird at the moment. It may extend straight back, curve upward at an obtuse angle, or rise straight up like the spike on a Prussian helmet.

The bird soars habitually over forest and clearings and undoubtedly crosses the high Talamanca Cordillera from one slope to the other. In the air it calls frequently while circling leisurely on flat wings. It also performs aerial evolutions, probably having to do with courtship, usually high in the air during the middle hours of the day. Calling in a very excited manner, the bird falls with folded wings, then opens them at the bottom of the dip; sometimes it completes a perfect loop. At these times the rufous brown on the anterior part of its body seems to form a reddish bar along each side of the neck.

Perched on a lofty limb, it may utter a call, very different from the one mentioned above, that alternately accelerates through a "laughing" series of notes and decelerates with an excited-sounding set of notes rising to and falling from small crescendos. The hunting bird, which perches usually at medium heights in the trees, makes a cry that could be taken for the snarling growl of a 100-pound cat. On one occasion my attention was drawn to two guans (*Penelope*) on the ground, which were screaming frantically each time the hawk sitting above them uttered this cry.

***Spizaetus tyrannus* (Wied)**

BLACK HAWK-EAGLE

RANGE: Southern Mexico to Peru and extreme northeastern Argentina.

The distribution of the Black Hawk-Eagle is virtually the same as that of the congeneric Ornate. Thus, the species appears to be more common on the Caribbean slope than the Pacific, and I have a lone observation for the Tropical Dry Forest and another for the northwestern divide. A report from San José on the central plateau may or may not be in error. Together with the Ornate, it has a broad vertical range in the humid life zones and is much more common than has been previously supposed. It inhabits wooded country and can be seen in the air over forested and deforested terrain with fair regularity. It is not, however, an inhabitant

of forest. Rather, it frequents second growth and small stands of trees in the semi-open beside woodland, including, where such habitat is present, extensively virgin-forested regions. Usually it perches rather low in the trees, apparently waiting in ambush before moving to another stopping place.

Like the Ornate, this hawk-eagle is noisy when high in the air. Its call resembles that of the Ornate in quality, and is similar to that of the Prince Hawk but with the pattern of the latter reversed. Both species of *Spizaetus* habitually soar high in the air in a slow, lazily retarded manner, often through a chain of rather small, interlocking circles. Very broad-winged and with long, broad, "powerful" tails, they are unmistakable in silhouette.

***Circus cyaneus* (Linnaeus)**

MARSH HAWK

RANGE: Breeds in Eurasia and North America; winters southward.

***Circus cyaneus hudsonius* (Linnaeus)**

RANGE: Breeds in North America; winters to Colombia and in West Indies.

The Marsh Hawk arrives in early October and leaves by the end of April. Unlike most migratory hawks in Costa Rica, it is very seldom seen in aerial transience. As a visitant it is fairly common from November to March in the central highlands down to about 2000 feet, along portions of the northwestern divide, in the dry-forested Pacific northwest, and the Térraba region far to the southwest. It is unknown in winter from tropical-belt elevations on the Caribbean slope, along which it passes in spring and fall migration.

In the above-mentioned regions the species apparently prefers extensive areas of largely or partly deforested country, such as the central plateau and its neighboring slopes well up into the lower montane belt, the northwestern scrubby ranch lands, and the cutover areas and savannas in the southwest. Along the northwestern divide I found it common in the vicinity of grass-covered Lake Arenal and not uncommon along the lower slopes of the Guanacaste Cordillera. In Costa Rica, as in the north, the bird generally quarters low over marshy areas, grassy and bushy fields, and agricultural and pasture lands.

***Geranospiza nigra* (Du Bus)**

BLACKISH CRANE HAWK

RANGE: Northern Mexico to Ecuador.

***Geranospiza nigra nigra* (Du Bus)**

RANGE: Northeastern and north-central Mexico to Panama.

The crane hawk in Costa Rica is primarily a Pacific species that occurs mostly around the Gulf of Nicoya, especially in the Tempisque basin, but it is not common, and I have met it only singly. There, in the Guanacaste lagoon country and the largely cleared areas north from the Barranca-Puntarenas district, it inhabits wooded patches scattered through the scrubby ranch lands. It spreads in decreasing numbers to the transition with the moister subtropical belt along the base of the volcanoes Tenorio and Miravalles; probably it occurs all along the lower slopes of the northwestern divide. In the humid southern half of the Pacific side it is present in apparently much smaller numbers. There it is met occasionally in the lower and upper portions of the Térraba Valley. There is also an old report from Pozo Azul de Pirrís, south of the entrance to the Gulf of Nicoya, and I found it once at the head of the Golfo Dulce. On the Caribbean slope it is very local if not extremely rare. I saw it several times only near Puerto Viejo in the Sarapiquí lowlands, and there are two records from the very humid Sixaola region near Panama.

This is a sluggish, weakly built hawk that is usually seen perched quietly or, perhaps, standing on a limb and bending over furtively to pick pieces from a small animal held in the claws. It is not apt to fly even when observed closely, but shows annoyance by a crestlike halo raising of the crown feathers. In the relatively arid northwest, where it obtains its prey, at least in part, by raiding knotholes in heavy limbs, the bird making its rounds deliberately investigates all likely cavities, including those in isolated trees in the semi-open, within the observer's radius of view. Sailing up to a hole, the bird clings to the rim with jackknifed legs and wings half-spread against the limb, and I have seen it poke its head in, as though drinking.

In the luxuriant Caribbean lowlands, by contrast, it is a woodland bird that prefers the forest border and open places inside the

forest, such as a wooded swamp. Here it apparently specializes in epiphytes, which it explores methodically. Fluttering or walking along the branches like a chachalaca, it moves from one air plant to another, probably in search of small amphibians. If successful, the bird flies to a perch in order to feed, but it may return shortly to the same bromeliad. Its long legs may be quite hidden from sight as, with wings opened and broad-feathered tail spread, constantly tipping for balance, the bird steps about inside the spike-whorled leaves. Occasionally I saw this relatively harmless hawk dived at by the flycatcher *Megarhynchus* and the oropendola *Gymnostinops*.

In general it occurs from below medium heights to the tops of tall leafy trees, and it may move about in the high crowns. In the relatively arid northwest I have seen it on a dead twig at the very tip of a tall tree, constantly flapping its tail for balance in the dry-season wind. Thus awkwardly situated, the bird kept repeating a rather mellow, prolonged "chyeer," of the sort expected from a songbird, at intervals of from three to five seconds. Normally its cry is a petulant or angry nonrepetitive "kyaow" or "keeur," screaming, somewhat tapered, rather nasal, much like that of a *Buteo*. Usually, however, the bird is silent.

FAMILY PANDIONIDAE

Pandion haliaetus (Linnaeus)

OSPREY

RANGE: Nearly cosmopolitan.

Pandion haliaetus carolinensis (Gmelin)

RANGE: Breeds in North America; winters from southern United States and Bahamas to Chile, northern Argentina, and Galapagos Archipelago.

The Osprey is a winter visitant distributed sparingly along both coasts and occurring at times well inland along the larger rivers to an altitude of at least 2000 feet; it is regular at Lake Arenal in the northwestern divide. In the spring and fall the presence of passage migrants, which seem to take up temporary residence, in addition to the wintering birds, helps make the species relatively common at those times of the year. Probably a few individuals remain through the summer. Coastal

river mouths and inlets, the wider the better, afford ideal conditions which several birds may share.

The Osprey can be identified by the fishing habit alone. Flying with rather rapid flaps alternating with flat-winged sails, its beak inclined downward and its talons clenched, it comes to a hovering stop from time to time and scans the water before plunging. Often it brakes the swoop just above the surface, when presumably the desired fish has disappeared from sight, then flaps itself upward to continue the aerial search. In the true dive the Osprey hits the water feet first with a clumsy splash. It emerges in a moment or two, shakes itself in mid-air, then continues on its way. If successful, it carries the fish, always head forward, like a pontoon clasped between its feet, and returns more or less directly to a favorite perch, usually a dead limb high on a lofty tree well behind the shore. The bird fishes in estuaries, river outflows, surf, and just beyond the breakers; occasionally it travels a good distance out to sea. In the interior, it generally perches much lower on overhanging heavy limbs along rivers. The Osprey apparently does not soar along the coasts; the habit seems restricted to inland birds.

Its cry consists of a number of annoyed-sounding separated "cheep"'s, not unlike those of a domestic chick, which are more likely to be attributed to a small bird than a large hawk. From a distance it may resemble a retarded yipping charged with a peculiar tension. At times the "cheep"'s are run into a more hawklike, screaming "pee·yeep," "wheee·eer," or "pee·a·reer."

FAMILY FALCONIDAE

Herpotheres cachinnans (Linnaeus)

LAUGHING FALCON

RANGE: Mexico to Bolivia and northern Argentina.

Herpotheres cachinnans cachinnans (Linnaeus)

RANGE: Nicaragua to Peru and northern Brazil.

This unusual bird of prey occurs along both slopes, mostly in the lowlands and foothills. In reduced numbers it is found in the lower subtropical belt along the northwestern divide and the slopes and spurs of the

Talamanca Cordillera in the southwest, very irregularly in the central highlands. It is common in the humid life zones, less common but regular in the southern half of the dry-forested northwest, and seems to be absent from the northern Guanacaste lowlands. It is more abundant in wooded regions, where it is met most often in semi-open situations, than in deforested ones with scattered trees. It occurs seldom if at all inside unbroken forest. It is met singly as a rule, though probably often present as a widely separated pair. It seems to feed mostly upon reptiles, especially snakes, which it swallows piecemeal.

It is a sluggish bird, not hostile to others, which flies seldom and, in my experience, soars not at all, although reputed to do so. A slow flyer, it alternates rapid flaps and sails on an even keel; its fluttering flight brings to mind that of a large Amazon parrot. Alighting at varying heights in the trees, the bird jerks its narrow tail up and down. It remains seated on a branch, either in open view or partly hidden by foliage, for indefinitely long periods. From time to time it glances to the ground, nods its head or jerks its tail, and sometimes slowly shifts position, perhaps sidling parrot-like with little steps along the branch. It can often be approached quite closely before it will take flight, generally for a short distance. This kind of molestation usually does not provoke the bird to any sort of utterance, but sometimes it nods its head, pumps its tail, and makes a heavy, nasal cackle like that of *Trogon massena*.

The interesting cries of the Laughing Falcon are responsible for its vernacular names. One of them, sounding indeed like a strange laughing, consists of a slowly descending series of notes that begins rather sweetly and ends sadly: "ha-ha-ha-her-her," or "haww harr herrér," or a slightly mad, short "háhahahahaha."

This call is heard infrequently. The bird utters far more commonly a characteristic two-note cry which has given rise to its Costa Rican name, "guaco." This, the typical call, is most often heard after sunset, generally at deep twilight. It begins, usually, with a number of consecutive "gwa"'s, uttered about every half second, which gradually intensify and transform into a far-carrying "gwa-co" repeated tirelessly as many as 50

times or more. Sometimes it begins with an "oo·oo·oo cow·cow·cow," or the "gwa"'s simply go downscale before leveling out; the body of the call may consist entirely of "gwa"'s. Sometimes a bird utters a few "gwa-co"'s which, unconnected and out of context, sound as though spoken by a parrot. Bearing no resemblance to a scream, whistle, or other sound usually associated with a hawk, the voice suggests a guan of some sort. Two separated individuals often call together in different rhythm and slightly different pitch. In consequence, the calls are at one moment given in perfect time with one another, the next in syncopation, then in antiphony, and so on. The gradually changing, offbeat doubling of the notes creates an odd sensation of mounting excitement.

***Micrastur semitorquatus* (Vieillot)**

COLLARED FOREST FALCON

RANGE: Central Mexico to Bolivia and northern Argentina.

***Micrastur semitorquatus naso* (Lesson)**

RANGE: Central Mexico to Colombia and the Guianas.

The Collared Forest Falcon is sparsely distributed over most of the country, from both coasts well into the lower montane belt in the central highlands, perhaps to similar altitudes along the Talamanca Cordillera. It prefers the lower elevations to the higher and is apparently less uncommon on the Pacific side than the Caribbean. It occurs mostly in heavily wooded regions, including contiguous second growth, thinned edges, and even the scrubby woods in lowland Guanacaste. It does not, in my experience, penetrate solid forest in Costa Rica and seems to be rare or occasional in heavily wooded areas of large extent.

Typically this forest falcon perches rather low, well concealed by foliage. Rather surprisingly for so large a bird, it dashes and twists noiselessly through the understory and second-growth vegetation with the facility of the smaller forest hawks. It is inactive when not hunting and dislikes leaving its perch when disturbed. At any rate, it usually lights only a short distance away. Boldness and fearlessness have earned it a reputation as a

chicken thief, but its betraying voice and sluggish habits invite destruction by a .22 rifle.

Its call, a several-times-repeated "ahr" (or "aow" or "pahl"), is not unlike that of the Laughing Falcon, but it is shorter and delivered more slowly. The individual note tapers and descends and bears a resemblance to the exhausted groan of a person in recurrent pain. Nearly always a higher-pitched weak "ahr," sounding distant, immediately precedes the full-voiced call, which, by contrast, sounds much closer; or the call may be preceded by a series of accelerating "kuk"'s that gradually transform into the "ahr" notes. The voice in all color phases of the adult as well as immature birds is the same.

***Micrastur mirandollei* (Schlegel)**

MIRANDOLLE'S FOREST FALCON

RANGE: Costa Rica to Peru and Brazil.

Micrastur mirandollei extimus

Griscom and Greenway

RANGE: Costa Rica to western Colombia.

This rare species is known in Costa Rica from two tropical-belt localities on the Caribbean slope. The first, a very old record, is Sipurio in the extreme southeast next to Panama. The second is the vicinity of Puerto Viejo in the northeast, where I saw it twice (Slud, 1960, pp. 58, 90). Perhaps the bird is a wanderer within its Costa Rican range, just as the congeneric, extremely similar *semitorquatus* seems to be. In contrast to *semitorquatus*, the present species is most likely a true woodland inhabitant of narrow ecological tolerance that is perhaps specially adapted to wet lowland forest.

The first time that I met the bird it was calling from the upper part of a medium-sized tree on a wooded river bank close to solid forest. The call, which I transcribed as several rising "weet"'s of the sort expected from some small bird, was completely different from anything given by *semitorquatus*. The second time, I found it (the same individual?) rather well inside forest, perched some 5 yards up. I was led to it by several nasal notes resembling in quality those of *semitorquatus* or *Herpetotheres cachinnans*, but the bird stopped calling at my arrival.

***Micrastur ruficollis* (Vieillot)**

BARRED FOREST FALCON

RANGE: Southern Mexico to Ecuador and northwestern and extreme northeastern Argentina.

***Micrastur ruficollis interstes* Bangs**

RANGE: Costa Rica to western Ecuador.

The Barred Forest Falcon is distributed throughout the humid life zones on both slopes, from the lowlands well into the subtropical belt and, in the central highlands, the lower montane belt. Though not recorded from the southeast, it undoubtedly occurs there. It is present along humid-forested portions of the Guanacaste Cordillera, probably also the Cordillera de Tilarán; it is apparently absent from all the Tropical Dry Forest as well as the central plateau proper. Relatively common for a woodland hawk, especially in the lower portions of its range, it is nevertheless not seen often even where more abundant than usual, as in the southwest. It extends its hunting operations to woodland edges, including contiguous second growth. Rarely have I observed it in sunlight or in the open a little outside woods. It perches on low branches or in thickets, seldom very far above the ground, usually well hidden in the forest understory. An individual may, however, sometimes call persistently in the canopy.

This fierce little falcon, *Accipiter*-like in habits and build, seems to prey mostly on small birds, which it secures by striking out from a perch through thickety viny cover. Its remarkable ability to make short turns and angular changes in direction is displayed as, for example, it pursues a low-flitting Pauraque (*Nyctidromus albicollis*) through dense growth. It is attracted more than any other raptor to army ants in order to prey upon the attendant birds, which flutter in fright in all directions. Yet the sudden attack, in my experience, is seldom successful, and the falcon lights on a nearby low perch, well concealed in a viny tangle. I find it difficult to believe that the scattered birds that return shortly afterward are not aware of its continued close presence. Moreover, they appear quite unconcerned even when it calls. The falcon, in turn, appears undisturbed by

the presence of the observer whose patience it regularly outwaits.

The usual call, very different from that of its Costa Rican congeners, consists of one to several distinctly separated barking sounds, much like those of a small dog, that resemble the word "our" pronounced very quickly. The bird also makes a rapid fowl-like cackle with a nasal snorting quality and "ur"'s or "uh"'s somewhat like those of *Trogon mas-sena*.

Daptrius americanus (Boddaert)

RED-THROATED CARACARA

RANGE: Southern Mexico to Peru and southern Brazil.

Daptrius americanus guatemalensis (Swann)

RANGE: Southern Mexico to central Panama.

The Red-throated Caracara is rather common in the humid life zones on both slopes. It is most abundant in the tropical belt and makes local appearances in the lower subtropical belt along the central highlands and the Talamanca Cordillera in the southwest, almost surely in the southeast, too. Though not reported from the northwestern Caribbean lowlands, it probably occurs there in wooded areas. The few old records from the central plateau probably apply to formerly wooded localities. Despite Frantzius' (1869, p. 367) report from Guanacaste, the species appears to be quite absent from the Tropical Dry Forest and is as yet unknown along the northwestern divide.

This peculiar bird occurs both inside forest and, more commonly, along forest borders, in thinned woodland, and in nearby clearings and plantations with tall trees. Outside the forest proper it generally stays high in the trees; inside the forest it may occur downward to the upper understory. It is usually seen in small parties of several noisy individuals, seldom alone. The groups apparently travel about, and the frequency of the species at a particular locality seems to vary seasonally. I presume that it preys on a variety of small animals and takes vegetable matter, though I have seen it actually feeding, only once, on a flat honeycomb attached to a curled green leaf. Perhaps its needle-pointed

claws allow it to cling to pendent nests of wasps, as reported by Skutch (1959a).

The bird is not shy, as it sometimes settles on a limb a few yards above the observer and may fly only a short distance when closely observed. It has a strangely galline appearance, perhaps because of the chicken-like shape of the yellow beak, the bare skin on the face and throat, the rounded wings, and the broad-feathered, rounded, long tail. Perched, its legs appear inserted far forward, under the chest, and the bird may walk along a limb as does a chachalaca. Its slow, seemingly labored flight consists either of steady whirring beats or, mostly, slow sails. In the air it rather resembles a ragged guan. Only once, in the month of May, did I happen to see three squawking individuals chase one another about in a tree-scattered clearing and from time to time come to rest lengthwise along a limb, in the manner of a nighthawk.

This noisy species makes heavy squawks, like those of a macaw with an animal-like growl. Its usual rough call, "cah, cah, cah·cah·caow," accounts for its native name, "gavilán de cacao." Another cry is an "ok·ok·ok," as loud and raucous as that of a macaw. The bird also emits a mixture of dreadful screams and squawks—"ooh, ow, aw, oh, ooh," and so on—as though it were figuratively clasping its head while witnessing in unbelieving horror the brutal murder of a loved one. The calling bird may lean forward with its neck extended in a vulturine attitude and nod its head up and down.

Polyborus plancus (Miller)

CRESTED CARACARA

RANGE: Baja California, southwestern United States, Florida and Cuba to Tierra del Fuego.

Polyborus plancus audubonii Cassin

RANGE: Southwestern United States and Florida to western Panama; Cuba and Isle of Pines.

The Crested Caracara is virtually restricted to the northwestern quadrant of the country. Singly or in two's or three's it is seen primarily in the Tropical Dry Forest and along the deforested lower slopes of the Guanacaste Cordillera. Once I found it feeding on carrion on the beach near Parrita in the Tropical

Moist Forest Life Zone, south of the entrance to the Gulf of Nicoya; it is not known farther south. Nor is it otherwise known from the Pacific slope except for a few old records pertaining mainly to wandering immature birds on the central plateau. A secondary center of distribution is the Río Frío region and probably other open areas in the lowlands approaching Lake Nicaragua; there is no other Caribbean report.

This is an open-country species that in Costa Rica prefers agricultural areas, cattle ranges, and beaches. Occasionally I have seen small groups aloft in burned pastures and fields that were being plowed; they were not at all shy. The bird walks well, is an accomplished flyer, and perches usually high in the trees. Shaped somewhat like a glider in the air, its flat or slightly bowed wings crossing the body at right angles, the bird sweeps and sails and also flaps. One of its utterances is a piglike bass rattle, which may be delivered with a backward toss of its head, from a lofty perch or on the ground. Another cry, "kreka-krek kreka-krek," rustles like a dry palm frond. Also given is a one-syllable, heavy "ě.ě.ě.ě.ě."

***Falco peregrinus* Tunstall**

PEREGRINE FALCON

RANGE: Nearly cosmopolitan.

***Falco peregrinus anatum* Bonaparte**

RANGE: Breeds in North America; winters to Chile and central Argentina and in West Indies.

Zeledón (1887, p. 125) merely listed the species without comment, and Carriker did not include it for Costa Rica. Aside from an unreported specimen, taken by Underwood in 1891, in the Museo Nacional de Costa Rica, I know of no record or report previous to my own (1960, p. 90). Probably the status of the Peregrine is largely that of a passage migrant; at any rate, I have seen bands of birds high in the air which I identified uncertainly as this species. On the Caribbean slope it is a rarely seen transient, mostly, it would seem, in the lowlands and along the foothills both in spring and fall. It is not known from the Pacific slope in migration, though it probably passes through there. It makes its

fall appearance in late September and in October; in the spring it seems to be gone by mid-April. In all, I encountered the species several times but at only four localities.

The Peregrine definitely winters in the lagoon country at the head of the Gulf of Nicoya, where I was able to find a few individuals fairly regularly during the dry season. There the bird perched high on tall trees bordering the ponds and flooded fields, from which it forayed for the shore birds present in fair abundance; I saw no attacks on ducks. I also noted it a few times in early April in the Río Frío region, where I suspect it may also winter. The following incident may be worth mentioning. In the spring I once saw a Peregrine launch itself from a tree, sweep rapidly across a protected pond, seize a gallinule, and carry it off in labored flight while the hooked victim was screaming piteously.

***Falco deiroleucus* Temminck**

TEMMINCK'S FALCON

RANGE: Southern Mexico to Peru and northern Argentina.

There seem to be only two Costa Rican records, both old, with definite locality, and I met the species only twice. These meager data suggest that Temminck's Falcon is rare, that it is restricted to the Caribbean slope, and that it prefers the very wet, cloud-forested middle altitudes. One of my observations, however, was made in the tropical-belt foothill approach to the northern slope of the Cordillera Central. This individual was perched quite tamely at medium height in a tree beside a road passing through partially cleared forest. It was eating an Aztec Parakeet, which is a swift-flying bird. My other observation was made in the lower montane gap between Barba and Irazú volcanoes. This individual was also perched in a tree in the semi-open, but at an altitude and in the sort of country frequented by the Red-tailed Hawk.

Temminck's Falcon, approaching the wide-ranging Peregrine in size and strength while very similar in appearance to the much smaller, widely successful Bat Falcon, may be more common than is supposed or highly specialized in its requirements. The niche for a good-sized native *Falco* seems to be otherwise unoccupied.

Falco albigularis Daudin

BAT FALCON

RANGE: Mexico to Bolivia and northern Argentina.

Falco albigularis albigularis Daudin

RANGE: North-central and northeastern Mexico to Bolivia and northern Argentina.

The Bat Falcon is distributed along both slopes, from the lowlands into the subtropical belt and, in the central highlands, to the lower montane belt. In the dry-forested northwest, however, it is rare or lacking north of the Barranca-Puntarenas district, and it is rare on the central plateau. Preferring the humid life zones, it occurs in generally wooded regions, including extensively forested ones, but avoids closed woodland. It is primarily a species of the semi-open that frequents clearings, plantations, and parklike areas with scattered tall trees. This fierce little falcon generally selects an unobstructed high branch or stub from which it makes sweeping forays for small birds, such as those flitting about the outer foliage of a semi-isolated tree, and then returns, usually, to a favorite perch. I have also seen it feeding on the wing on prey held in its claws.

Perched, the bird sits in open view, very straight and still, and constantly looks about. I have seen it run along branches, but for what purpose I do not know. Its rushing flight is powered by very quick, almost fluttering, short-arc'd, steady beats, like those of the large swift, *Streptoprocne*, which it resembles also in general appearance and silhouette in the air; at these times the bird often gives its excited-sounding call. The bird also flaps and sails in soaring circles (again like *Streptoprocne*). Though widely distributed, it occurs singly and often in two's, probably a mated pair, at a particular site the nature of which is a permanent or semipermanent territory. The hunting bird may cover a radius of perhaps half a mile or more, but generally it keeps within sight of one of its favorite perches.

Its call is a rapid series of "kik" 's, "kir" 's, "tsir" 's, or "kee" 's, sort of squeaky and nasal. Also given is a short rippling "dídítit."

Falco columbarius Linnaeus

MERLIN

RANGE: Breeds in Eurasia and North America; winters southward.

Falco columbarius columbarius Linnaeus

RANGE: Breeds in northern North America; winters from southern Texas, southeastern United States, and West Indies to Peru and Venezuela.

The Merlin is seen rarely in Costa Rica. It migrates in apparently small numbers along the Caribbean slope and over the central highlands; there is no report from the Pacific side. In the fall it arrives probably by late September. I have seen it twice in October, both times singly, in the Sixaola region and on a subtropical ridge facing the Reventazón Valley. In the winter it has been reported occasionally from the central plateau, and I saw an individual above timber line at the crater of Irazú Volcano. I have no information about its occurrence in the spring. The bird evidently prefers open and semi-open country for its hunting operations, which are those of a dashing *Falco*.

Falco sparverius Linnaeus

SPARROW HAWK

RANGE: New World.

Falco sparverius sparverius Linnaeus

RANGE: Breeds in North America; winters to Panama (also possibly Colombia) and in the Bahamas and Cuba.

The Sparrow Hawk, or American Kestrel, is not represented by a resident population in Costa Rica, only by visitants from the north. It begins to arrive by early August, but is not seen commonly until September and especially October. Regularly in the autumn of different years I have observed a procession of individuals migrating southward, perhaps to Panama, along the Pacific littoral. The bird remains in the country until at least the end of March or the first part of April. The only summer report is that of a nearly tailless individual noted on June 25 and again on July 2, 1943, by Skutch (1944a). In the winter the species is common over much of the country along both slopes, from the lowlands well into the subtropical belt and, in the central highlands, upward into the lower montane belt.

The bird prefers to inhabit open and semi-open terrain. Hence it is uncommon to rare or lacking in the heavily forested Caribbean lowlands, even at suitable openings; but it is occasional to frequent in the agricultural por-

tions of the lowlands and in partially cleared areas on the foothills. In the central part of the country it is common to abundant, primarily at subtropical elevations, from the eastern slope of Turrialba Volcano and the Reventazón Valley across the central plateau, on the neighboring deforested rising slopes, and, to a lesser extent, on the transmontane northern versant of the Cordillera Central. It is unusually abundant along low portions of the northwestern divide, particularly the cattle lands at the bases and lower slopes of the Pacific side of the Guanacaste Cordillera; and it also occurs commonly in the Tropical Dry Forest, from the Tempisque basin northward to Liberia. In the southwest, too, it is rather a common winterer in cleared country at upper tropical to lower subtropical elevations.

The Sparrow Hawk is solitary and sedentary even when present as a concentration plentifully scattered about. Usually it perches rather low, as on scrubby trees, shrubs, electric wires, and posts. The bird flaps leisurely out from its station and hovers before dropping on its predominantly insect prey. Seldom does it make the spirited sweeps of the other members of its genus in Costa Rica. Returning to the perch it alights with a good deal of tail balancing. Occasionally it utters a rapidly iterated "klirnk."

FAMILY CRACIDAE

Crax rubra Linnaeus

GREAT CURASSOW

RANGE: Eastern Mexico (and Cozumel Island) to western Ecuador.

Crax rubra rubra Linnaeus

RANGE: Eastern Mexico to western Ecuador.

The Great Curassow is distributed along both slopes, mostly in the tropical belt but also in portions of the subtropical belt in the central highlands, along the Guanacaste Cordillera, probably also the Cordillera de Tilarán, and almost surely both slopes of the Talamanca Cordillera. In the dry-forested northwest it occurs in apparently small numbers in the lowlands at the head of the Gulf of Nicoya. But at the bases and lower slopes of the Guanacaste mountains, particularly at Rincón de la Vieja, it is still fairly common

though ruthlessly hunted. For the most part this turkey-sized bird frequents humid woodland, including virgin selva, but it also occurs at overgrown ravines in partially cleared areas and in thickety, scrubby woodland, as on the western approach to the northwestern divide.

A terrestrial forager, occurring singly and in small parties, it rises into the trees to escape or to rest. On the ground it steps carefully and looks around cautiously. If the observer makes no untoward movement, the bird is apt to continue nervously on foot within his sight, unlike, for example, the Great Tinamou, which under similar circumstances walks away at an accelerated pace. I have never seen it foraging in trees where, except that it may look about nervously, it usually stands immobile on a limb as if it were a protectively colored species. At a little distance, incidentally, the yellow knob and cere of the male remind me of a great parrot-beak.

This curassow makes at least three kinds of sounds, of which the best known is a deep hum, low and hollow, almost impossible to locate. If disturbed when afoot it may give a short, sharp, high-pitched "peet" or "weet" of the sort expected from a small bird. From a walking individual I have heard iterated "pweet"'s or "pwit"'s, with an underlying throaty thump, similar to but sweeter than those of the flycatcher *Pipromorpha oleaginea*. Also given is an attenuated lingering whistle that lazily descends through an arc, like the slow escape of steam from a valve; sometimes it is broken into two or more parts.

Penelope purpurascens Wagler

CRESTED GUAN

RANGE: Mexico to Ecuador and western Venezuela.

Penelope purpurascens aequatorialis Salvadori and Festa

RANGE: Nicaragua to western Ecuador.

The large, arboreal, turkey-like Crested Guan is fairly common to locally abundant in many of the wilder parts of the country. Ranging from sea level to perhaps 6000 feet, it is most common in the humid tropical belt and still plentiful in the lower half of the subtropical belt. A woodland species, it may occur also in scrubby semi-open areas, as in the lowlands at the head of the Gulf of Nicoya

and in the Río Frío region, where normally I would not expect it.

Usually several individuals forage silently together on the topmost limbs of the taller trees in forest. They walk slowly along the branches and from time to time leap across gaps with or without the aid of the wings. Often screened from sight, their presence, like that of parrots, is betrayed by the patter of falling debris. Made suspicious of danger, they step with great care and look in all directions, often partially exposing themselves. If uncomfortably apprehensive they may glide away like shadows. But more often they take flight with loud wing rustlings and alarmed cries, sailing on bowed wings and great tail spread to a nearby spot in the canopy. Now they become difficult to approach and at renewed provocation fly some distance to safety.

The habits of this bird invite its self-destruction. Its cries attract hunters and, even when high in a tree, it makes a conspicuous target. By taking to flight it reveals its exact location. Besides, as mentioned above, it generally does not fly far. It may even pose in plain sight on a low branch, perhaps in the semi-open close to habitations, then makes matters worse by calling. The survival of this mercilessly hunted species depends on an extensive reserve of woodland from which its losses at the fringes can be replenished. When the forest is reduced below a critical minimum or parceled into islands open to hunting from all sides, the Crested Guan disappears for good.

Its distinctive single- or double-note honk sounds like an old-fashioned automobile horn or a mixture of goose and clucking hen. It is usually given in series often preceded by a catch or pop in the style of the jay *Psilorhinus*. Its cries become excitedly more rapid and critically higher pitched when the bird is frightened into flight. When several birds call in confused chorus a recognizable pattern emerges only at intervals. Also given are pig-like grunts, an animal-like, low "woofwoof-woofwoof," and a throaty "cawcáwk" or muffled "áwwuķ."

***Ortalis vetula* (Wagler)**

PLAIN CHACHALACA

RANGE: Southern Texas to Costa Rica.

***Ortalis vetula plumbiceps* (Gray)**

RANGE: Southeastern Mexico to Costa Rica.

The Plain Chachalaca is definitely known in Costa Rica by a bird collected August 19, 1929, by Austin Smith at Ballena in the Tempisque Valley in lowland Guanacaste. The specimen (U.M.M.Z. No. 134911) was brought to my attention by Alexander Wetmore. Re-examining my notes, I find that I had heard chachalacas at the head of the Gulf of Nicoya and collected one December 8, 1950, at Mojal in the upper Nicoya Peninsula. This specimen, which I had prepared as a skeleton with the measurements of wing (arc) 200 mm. and tail 220 mm., I misidentified as an immature *garrula* because it lacked chestnut on the primaries. As the immature *garrula* does show unmistakable chestnut in the wings, I now believe my bird was *vetula*.

Future observations should determine whether the species extends southward, locally and perhaps not uncommonly, at least as far as the entrance to the Gulf of Nicoya. It would appear that the Plain Chachalaca replaces *garrula* in the Tropical Dry Forest and that *garrula* in Costa Rica is better adapted to the more humid life zones. This sort of complementary ecological distribution is paralleled, for example, in the congeneric crakes, *Laterallus ruber* and *L. albigularis*.

***Ortalis garrula* (Humboldt)**

CHESTNUT-WINGED CHACHALACA

RANGE: Southeastern Honduras to Colombia.

***Ortalis garrula frantzii* (Cabanis)**

RANGE: Caribbean slope from southeastern Honduras to northern Costa Rica.

***Ortalis garrula cinereiceps* (Gray)**

RANGE: Southern Costa Rica (both slopes) to eastern Panama.

The Chestnut-winged, the common chachalaca of Costa Rica, is widely distributed exclusive of the subhumid northwest. It ranges from the lowlands upward into the subtropical belt, usually not above the lower portion, but may rise locally to the lower montane belt, as on the Caribbean versant of the central highlands. Virtually confined to the humid life zones on both slopes, it laps

over the Caribbean-influenced Pacific face of the Guanacaste Cordillera, uncommonly and very locally, and has yet to be recorded from the Tropical Dry Forest Life Zone. Costa Rican birds are clinally intermediate in appearance between *frantzii* and *cinereiceps*. While usually keeping the dark crown of *frantzii*, they tend toward the lighter belly of *cinereiceps* in the direction of Panama.

The bird occurs in generally wooded areas but is not an inhabitant of forest. It frequents plantations and secondary growth where thickets and shrubs are mixed with trees, also parklike areas and overgrown woodland borders. Sometimes it goes to the ground, and I once met it in a small marsh enclosed by sub-forest. But it is essentially arboreal amid thickety stands and shrubbery with emergent trees. A hunted species, it yet can be found near houses in agricultural lands.

It is seen as a rule in groups of several to perhaps a dozen individuals usually in the process of leaving one tree or copse for another, in the manner of araçarís (*Pteroglossus*), sailing out singly in staggered follow-the-leader fashion. If disturbed the birds leap in steps to higher branches, then volplane off to another stopping place, at times departing a perch with a few flutters, noisy or not, before easing into the glide. Moving, as they generally do, circumspectly along branches, they sometimes bring to mind Brown Jays (*Psilorhynchus*) in pattern and tone of plumage and also in form and actions. Occasionally among a group of these social birds I noted two members billing "tenderly" for a moment or two, as do anís or parrots.

The cries include a soft "whirk," like that of some small bird; an irritated single-note "éuk" or "peeúk" suggestive of either a cluck of a hen, with an underlying squeak, or the call note of the flycatcher *Myiarchus crinitus* given with a throaty catch or rattle; a short squeal that may terminate as a knocking "kuk," delivered in series; a rapid chuckling gabble, "wuh-yikyikyikyikyik," and so on, that often comes abruptly to a halt.

See Skutch (1963a) for more detailed life-history notes.

Chamaepetes unicolor Salvin

BLACK GUAN

RANGE: Costa Rica and western Panama.

The Black Guan is known mostly from the central highlands, from timber line down to subtropical elevations. There is a report from the Guanacaste Cordillera (Cerro Santa María), I found it not uncommon on the Cordillera de Tilarán (above Monteverde), and there is a record from the Talamanca Cordillera (Ujarrás de Térraba), where the species is probably common. Evidently preferring cool and wet cloud forests, it is found under these conditions down to 3000 feet. It is nearly restricted to "wild" areas in which it frequents the natural breaks in the mountainous terrain, such as steep slopes, ridges, and ravines. Sometimes it enters the highland parklike pastures at the time of the afternoon mists.

Carriker (1910, p. 385) "rarely ever saw the bird on the ground, their manner of feeding seeming to be confined to climbing about among the limbs of trees and picking off the fruit. While feeding they are always very quiet and the mere presence of a person under the tree will not cause them to fly, although they usually cease feeding." Depending on the locality or probably to a greater extent on hunting pressure, it is sometimes extremely wary, at other times sluggishly "stupid." I have seen it singly, in two's, at most in three's at various heights in the trees, rarely on the ground. Specimens do not do justice to the living bird whose pinkish red legs, red eyes, and bright blue face contrast colorfully with the black plumage. The flying bird flaps and then makes a long glide in the manner typical of long-tailed cracids. If disturbed in a tree, it looks around with lowered neck and humped back in a vulturine attitude.

Ferry (1910, p. 260) "was attracted by an uncanny, indescribable sound. It might have been a partridge drumming a great distance away, but it evidently came from close at hand." He did not say whether the sickle-shaped outer primaries were responsible. I have heard from this bird grunting noises which, so far as I could tell, were vocal in origin. They sounded variously like weak grunts, wing drummings, or a pig crunching corn, in the last case accompanied by indrawn grunts which I transcribed as unclear "bohr" 's. A bird that I found on the ground with a brown immature, one-third grown and capable of fluttering flight, attempted to dis-

tract my attention by approaching within 20 yards and uttering continuously a squeaky grunt and a more excited, double-note, twanging, bullfrog-like call similar to the above-mentioned "bohr."

FAMILY PHASIANIDAE

Dendroortyx leucophrys (Gould)

BUFFY-CROWNED WOOD PARTRIDGE

RANGE: Southern Mexico to Costa Rica.

Dendroortyx leucophrys hypospodius Salvin

RANGE: Costa Rica.

The Costa Rican population is known only from the cloud-forested central highlands, including the Dota Mountains. It ranges from the upper subtropical belt through most of the montane belt, with its center of abundance in the middle altitudes. It is not recorded from the northwestern divide, from which it may indeed be absent, or the Talamanca Cordillera, along which it is probably present, at least at the northern end. It seems to be restricted to clearings, openings, and woodland edges densely covered with thickety growth and brush; it may also occur in grassy, parklike, highland pastures. Though the "chirascuá" is well known to people living in the central highlands, neither Carriker nor I happened to encounter this wary bird in Costa Rica.

I did meet the species, only once, in a luxuriant, broad-leaved, cloud-forested area at 6000 feet in Honduras. This particular individual was on the ground in a densely overgrown small clearing. It was apparently in a state of excitement, as it kept making a chucking reedy gabble and did not attempt to escape. Its pointed tail, about one-third of the total length of the bird, was vertically compressed, like that of a chicken, quite unlike its "normal" appearance in study specimens. Dickey and van Rossem (1938, pp. 157-158) commented: "In handling skins one fails utterly to gain a correct idea of this bird in life. It has a 'long-legged' appearance with erect posture when unobserved, but on the least alarm will flatten out and dart away through the brush with rapidity and silence. The body is compressed laterally to a point equalled only by some of the rails, and is thus well adapted for slipping through the close growing stems of its usual habitat."

Colinus leucopogon (Lesson)

SPOTTED-BELLIED BOBWHITE

RANGE: Guatemala to Costa Rica.

Colinus leucopogon dickeyi Conover

RANGE: Southwestern Nicaragua to northwestern and central Costa Rica.

The native bobwhite occurs primarily in the northern half of the Pacific side of the country, from the lowlands to the cleared lower slopes of the Guanacaste Cordillera and over the entire central plateau to its Caribbean edge in Cartago Province. This distribution conforms to that of a Costa Rican member of the arid Pacific avifauna of Central America. The species is most numerous in Guanacaste, where it is one of the characteristic birds and the only quail in the Tropical Dry Forest. An inhabitant of open country, it frequents grassy fields, especially shrubby borders and fence rows, and the scrubby ranch lands, especially thickety stands and overgrown ravines. The deforested central plateau region, including its moister Caribbean portion, provides similar habitat in which, however, the bird is not nearly so common.

The bird goes about in coveys the members of which, stumbled upon by the observer, run away very quickly and smoothly with head held high and body erect; normally the bird bobs its head as it walks. A covey makes twittering sounds that change to a "prrrit" when the birds are disturbed. If pressed, they take to fluttering flight, soon altered to laterally tipping or rocking sails, and some of the birds may light on slender branches in shrubs or thickety scrub. The familiar bobwhite note, heard from all sides in Guanacaste, may sound like "bob-bob white"; sometimes the "white" becomes a powerfully aspirated "whit." Also given are an "ehéh dd" and, in flight, a soft "chit·chit·chit," like the whistling of wings.

Odontophorus gujanensis (Gmelin)

MARBLED WOOD QUAIL

RANGE: Costa Rica to Bolivia and Mato Grosso.

Odontophorus gujanensis castigatus Bangs

RANGE: Southwestern Costa Rica and adjacent western Panama.

The Marbled Wood Quail, in Costa Rica at its northern geographic limit, is restricted to the humid southern half of the Pacific side of the country, from approximately the entrance to the Gulf of Nicoya to Panama. Vertically it ranges from the lowlands to about the middle of the subtropical belt along the slopes and spurs of the Talamanca Cordillera, but it seems not to have been reported from the Dota region. It is a forest inhabitant that occurs also in shaded secondary woodland and at breaks in forested terrain. A terrestrial bird that roams about in coveys, it escapes on foot or, if surprised or hard pressed, by flying to a low branch on which it freezes, often with flattened crest. Skutch (1947a, p. 231) noted that eggs were laid in January, April, and probably May; hence it may be worth mentioning that a female I collected August 15, 1951, out of a covey in the Golfo Dulce region had the ovary in breeding condition.

Its usual call is a three-note "k·wúck·oo," and so on, or a four-note one that sounds like the Spanish "por debajo." The call is largely or entirely antiphonal, one of a pair calling "kooók," the other "kláwkikoo," the combination producing the above-mentioned "por debajo" or the "corcorovado" of Chapman (1929, p. 275). This liquid, throaty call is repeated over and over mechanically. Birds in a band are generally rather noisy, uttering many "what"'s, each followed by a gibbering or twittering watery gabble, something like the chatter of its antbird neighbors, *Thamnophilus bridgesi* and *Myrmeciza exsul*.

***Odontophorus erythrops* Gould**

BLACK-EARED WOOD QUAIL

RANGE: Honduras to western Ecuador.

***Odontophorus erythrops melanotis* Salvin**

RANGE: Nicaragua and Costa Rica (and probably adjacent Caribbean Panama).

This wood quail in Costa Rica is primarily an inhabitant of the Caribbean slope, from the lowlands that fringe the first foothills upward through most of the subtropical belt along the northern and eastern sides of the Cordillera Central. It seems to be most numerous in the very humid northeastern sector. It rises along the northwestern divide to overlap cool subtropical portions of the

Guanacaste Cordillera under the humid Caribbean climatic influence; there is no report from the Cordillera de Tilarán. Elsewhere it has been recorded from the Pacific versant in the mountains south of the central plateau and in the Dota region.

A forest inhabitant, it forages terrestrially in the deep shade of virgin woods and contiguous tangled second growth. It occurs in small, family-sized groups, in two's, or even singly, not in large bands. When disturbed the bird may exhibit an exaggerated vertical nodding or "freeze" on the ground, whether protected or not by dense thickety growth, or on the low branch to which it flushed. Its usual call, often given repetitively in the early morning and very late afternoon, sounds like "kláwcoo kláwcoo" and so on, or a reversed "kookláwk kookláwk," and so on. The bird also makes three dove-like "coo"'s or "oo"'s, spaced well apart; the note is also given singly or in two's. Another utterance is a subdued, high-pitched chatter similar to that of the antbird *Myrmeciza exsul* or the nunbird *Monasa morphoeus*, both of which may be present in the same places as the quail. Also produced is a rubbing animal-like growl.

***Odontophorus leucolaemus* Salvin**

WHITE-THROATED WOOD QUAIL

RANGE: Costa Rica and western Panama.

***Odontophorus leucolaemus leucolaemus* Salvin**

RANGE: Caribbean Costa Rica and western Panama.

***Odontophorus leucolaemus smithianus* Oberholser**

RANGE: Dota Mountains, Costa Rica.

In Costa Rica the species is known chiefly from the central highlands, including the Dota Mountains. It also inhabits the northwestern divide, whence reported from Tenorio in the Guanacaste Cordillera, and I found it fairly common at Monteverde on the Cordillera de Tilarán. The species is to be expected along the Talamanca Cordillera, at least on the Caribbean side, for which the only report is from the northeastern foothill approach.

The nominate race, *leucolaemus*, occurs on the slopes that enclose but mostly face away from the central plateau as well as in the

upper subtropical and lower montane belts in the northwest. The race *smithianus*, restricted to the Dota region, apparently occurs at similar altitudes under corresponding climatic conditions. Though this population is supposed to consist merely of melanistic individuals, Austin Smith expostulated in a letter to H. O. Havemeyer (August 2, 1933): "I have handled perhaps more specimens in the flesh than any (white) man living! and certainly within Costa Rica collected it at more stations than any of my predecessors . . . I have never found *O. leucolaemus* on the Pacific slope of Costa Rica. As far as melanism is concerned . . . it does not preclude *O. smithianus* from being recognized as a form. For its range is entirely isolated by higher ranges . . . I have never seen a specimen of *O. leucolaemus* (from Caribbean slope) as dark and small as *O. smithianus*. This latter . . . is not rare (or unknown) to the natives that live within its range—they call it Chiroquaqua negra or Gongolona negra and assert that it is always entirely black." Whether or not the names "chirascuá negra" and "gongolona negra" apply, as I suspect, to the Black Guan (*Chamaepetes unicolor*), the fact remains that when one plots the collecting localities on a map, it does indeed become evident that the known range of *smithianus* is disjunct from that of *leucolaemus*.

Carriker (1910, pp. 388–389) wrote: "Like all other species of the genus it is an inhabitant of the forest, congregates in small coveys, and keeps to the thickest parts of the jungle." My limited experience with the species is confined to *leucolaemus*, which I found in scrubby, viny, shaded second growth adjoining taller woodland. Its call, not clear as in most other *Odontophorus*, is a rushing gabble that breaks out suddenly from several individuals. It is patterned into two sets of paired syllables, the first of which is accented, which are repeated over and over.

***Odontophorus guttatus* (Gould)**

SPOTTED WOOD QUAIL

RANGE: Southern Mexico to western Panama.

This species is known primarily from the central highlands, including the Dota region. It has also been taken at two localities along the Talamanca Cordillera in the southwest

(Ujarrás and Cañas Gordas). It is almost unknown below the middle of the subtropical belt, but ranges upward, according to Carriker (1910, p. 389), to timber line. Judged by the considerable number of specimens collected, the species would appear to have been rather common on the central plateau and its neighboring slopes, probably in scrub and thickets rather than tall forest.

Quite unexpectedly I met the bird at the inner edge of the Sarapiquí lowlands. Several years before, in April, 1954, I was made suspicious of its presence by some spotted contour feathers plucked from a bird prepared for the pot. During 1957–1958, I saw small groups a few times and learned to distinguish its call from that of the much more common *erythrops*. Except for one occasion at a forested swamp, I never saw or heard it inside the forest, only along the forest border and in second- and third-stage secondary woodland. As the species seems to have gone unrecorded below the middle altitudes in southern Central America, it possibly engages in a seasonal vertical migration to and from the lowlands. Its unmusical call is a repetitive patterned "gahble gahble," and so on, or "gagobble gagobble," and so on.

***Rhynchortyx cinctus* (Salvin)**

LONG-LEGGED COLIN

RANGE: Honduras to western Ecuador.

***Rhynchortyx cinctus cinctus* (Salvin)**

RANGE: Costa Rica to northern Colombia.

The Long-legged Colin is known from only two localities: Villa Quesada, where collected by Austin Smith, and La Marina, where I took a specimen, respectively at subtropical and transitional upper tropical elevations in the north-central Caribbean foothills. This very humid region is still heavily forested in part. Smith's specimen was an immature female "shot out of flock of *O[dontophorus] e[rythrops] melanotis*." At La Marina I met the species twice on the forested steep slope of a stream valley. Both times it was in a group of at least three individuals which took to low flight for a short distance before landing. I know nothing else about it.

Rowley (1878, pp. 40–41) wrote: "Mr. Boucard informs me that this species is found in the hills [at Agua Dulce, Panama] near the

sea, in tropical forests, and is scarce. Small numbers of both sexes are seen together, always on the ground, feeding principally on worms, insects, and larvae, perhaps also seeds. They run very quickly when frightened, and sometimes fly, but not more than a few feet above the ground, making a great noise with their wings, 'like Snipes;' but they cannot stay long in the air. It is only by accident that they are discovered, as they always keep in dense and dark forests. The eggs are laid upon the ground; but Mr. Boucard did not find any. . . . It is hard work hunting for specimens, as at Agua Dulce the forests are magnificent, the country quite tropical, and the heat excessive."

FAMILY ARAMIDAE

Aramus guarauna (Linnaeus)

LIMPKIN

RANGE: Southern United States and locally to Bolivia and north-central Argentina; Greater Antilles.

Aramus guarauna dolosus Peters

RANGE: Southern Mexico to Costa Rica.

The Limpkin occurs in isolated colonies at marshy lagoons along the Caribbean coast north from Puerto Limón (in unknown abundance), in the Río Frío region near Lake Nicaragua (commonly), at the delta of the Río Térraba (in unknown abundance) in the southwest, and the Tempisque basin, especially at the head of the Gulf of Nicoya and near Santa Cruz de Nicoya, in the northwest. Also, I met a single wandering individual well inland in the Sarapiquí lowlands.

It is primarily in lowland flooded Guanacaste that the species can be seen regularly and in fair numbers, either singly or in loose groups. The presence of large fresh-water snails, upon which it seems to feed almost exclusively, evidently accounts for the presence of the bird. In an assemblage that includes silent spoonbills and ibises, croaking herons, chattering jacanas, grunting cormorants, and squealing tree ducks, the vociferous Limpkin sounds the keynote of the Guanacaste lagoons.

Like a heavy-set rail the bird steps jerkily, flicking its tail and nodding its head at every stride, punctuating the uncoordinated movements with a "chup." But, unlike any normal

rail, not only does it not hide but its actions invite attention. It may hurry over the floating vegetation, on which it can walk, like a jacana, without sinking, and flicks and jerks and often screams in open view. Or it may fly clumsily to the top of a low tree on which, completely unprotected, it balances itself uncomfortably to the accompaniment of its own loud, alarmed cries. Ungainly and awkward when perched, its appearance in the air is even more so. Its outstretched neck and legs hang, and the very manner of flight, featuring a jerky accent on the upbeat, distinguishes this bird from most others; its rounded wings, spreading some $3\frac{1}{2}$ feet, are surprisingly broad. The flights are usually short and low, not higher than 30 feet or so. Settling to rest the bird holds its wings raised for a little while. The impulse to take to the air often seems a senseless urge to effect a pointless journey.

The voice is used freely day and night and in different parts of the range of the species has given rise to the names "correa," "carau," "crazy widow," "crying bird," "lamenting bird," "clucking hen," all of which fit. Typical is a wailing "kkkrraoww," also delivered in any of several abbreviated variations, which has been likened to the cry wrung from a person afflicted by a toothache. Also uttered are a nasal or reedy "skrowk" or "skock," a heavy "tchrock," a twanging "skurr," and a hoarse, heron-like croak, broken perhaps by a scream. The iterated "chup" fills otherwise silent interludes.

FAMILY RALLIDAE

Pardirallus maculatus (Boddaert)

SPOTTED RAIL

RANGE: Locally from southern Mexico to Peru and east-central Argentina; Trinidad, Cuba, and formerly Jamaica.

Pardirallus maculatus insolitus (Bangs and Peck)

RANGE: Southern Mexico, British Honduras, Costa Rica.

Until recently the only Central American record south of British Honduras had been an unpublished one of an adult in the British Museum (B.M. Reg. No. 1949-58.70). This bird was collected by Charles H. Lankester on March 19, 1925, beside a marshy lagoon at

Las Cónccavas, Costa Rica, between Cartago and Paraíso on the eastern (Caribbean) portion of the largely deforested central plateau. Mr. Lankester has written me: "The incident of the *Pardirallus* was remarkable as on the day after I heard a strange new call, Dr. Thomas Barbour and a friend came to stay with us, and he placed it on my description and attempted imitation. . . . [The following day I] went down to the laguna, saw-shot-skinned the said bird. He was delighted his determination was right. I never again heard the cackling note."

While terminating this report, I was advised by Donald A. Jenni (personal letter) that he and Dale E. Birkenholz had encountered eight or nine Spotted Rails during July, 1963, at a fresh-water marsh on the grounds of the Inter-American Institute of Agricultural Sciences near Turrialba (altitude 2000 feet), also on the Caribbean slope. The birds were spaced about in apparently territorial pairs, and "the call, given when the birds were disturbed, is a four-note whistle consisting of a longer first note and three shorter notes following in rapid succession." Two females (now A.M.N.H. Nos. 768816, 768817), both with enlarged ovaries (largest ova, 7 mm. and 3 mm., respectively), were collected. Birkenholz and Jenni, at this writing, are preparing a detailed account for publication.

Another vocalization has been reported by Dickerman and Warner (1961), in southern Mexico, who heard "a sound not at all unlike very muffled 'pumpings' of the American Bittern." A fourth description of the cry, similar to the one heard by Lankester in Costa Rica, was published by Watson (1962), who heard "grunting" noises and an "accelerating clucking" from the Cuban population.

Watson (*ibid.*), on the basis of the Costa Rican specimen in the British Museum, which he did not personally see, extended the mainland range of nominate *maculatus* from South America northward at least as far as Costa Rica. I have examined this specimen which, by reason of its small white spots and short white streaks on the upper parts, is separable at a glance from the entire series of South American *maculatus* in the American Museum of Natural History, all of which have

elongated or linear white streaks. In fact, its white markings are virtually identical to those of a specimen of *insolitus* from Chiapas (U.S.N.M. No. 400035), though the brown-plumaged portions of its upper parts are lighter in tone and thus approximate those of the South American birds. However, the two fresh-plumaged Costa Rican birds taken by Birkenholz and Jenni match the type of *insolitus* (M.C.Z. No. 16029) both in darkness of the upper parts and marked reduction in size of the rounded white spotting. The narrower white bars on the under parts make these two birds the most extensively black below of the total of eight adult specimens known from mainland Middle America.

***Amaurolimnas concolor* (Gosse)**

UNIFORM CRAKE

RANGE: Southern Mexico to Bolivia and Brazil; Jamaica (probably extinct).

***Amaurolimnas concolor guatemalensis*
(Lawrence)**

RANGE: Southern Mexico to Peru and Brazil.

A rarely seen species, though undoubtedly more common than supposed, the Uniform Crake was not even listed for the country by Zeledón or Carriker. It has been taken at six localities, mostly in the northern, northeastern, and east-central sectors of the lower Caribbean slope. One of the records is from barely above the limit of the tropical belt in the foothills of Turrialba Volcano. Another from San José is possibly inaccurate. The bird has not yet been recorded south of the latitude of Puerto Limón. Its habits, as described for the Jamaican race by Gosse (1847, pp. 369–370), render it inconspicuous and easily overlooked.

I collected it once and saw it only once again. In life this rufescent little rail has the appearance of a small edition of the large wood rails (*Aramides*), especially in the color of the soft parts: yellowish bill, reddish legs, red iris. Moreover, it frequents the same sorts of places. The two individuals that I met were skulking on the ground near streams in shaded woodland. They were not particularly shy, but, as with the terrestrial antbird *Formicarius analis*, for example, they were constantly losing themselves in the ground

cover. The bird that I collected kept giving a note I neglected to transcribe.

***Aramides cajanea* (Müller)**

CAYENNE WOOD RAIL

RANGE: Central Mexico to Bolivia and northern Argentina.

***Aramides cajanea plumbeicollis* Zeledón**

RANGE: Caribbean Costa Rica exclusive of extreme southeast; possibly in adjacent Nicaragua.

***Aramides cajanea cajanea* (Müller)**

RANGE: Western and southern Costa Rica to Peru and northern Argentina.

This common wood rail is distributed through the humid life zones on both slopes, from the lowlands well into the subtropical belt, including the Pacific side of the Guanacaste Cordillera. It is absent from the Tropical Dry Forest, except southward from the transitional Río Grande de Tárcoles. The Caribbean race, *plumbeicollis*, is replaced in the extreme southeast by the South American *cajanea*, which otherwise occurs in Costa Rica mostly in the Pacific southwest and has been recorded northward from the Pacific side of the central plateau. The species is found where humid woodland, tangle-banked streams, and marshy thickets combine to form impenetrable cover. Sometimes a marshy thicket or a vegetation-choked ravine within the limits of a small village (as at Boruca) alone suffices. The bird may even occur in canefields and scrubby pastures if the former possess ditches and the latter swampy thickets. It is also present in mangroves.

The population in an area is considerably larger than that inferred from the few individuals one happens to see. Wary and secretive, the bird seldom allows more than an occasional, usually unsatisfactory glimpse. Yet sometimes it seeks food openly in short grass close to thickets, or wades or stands in a streamlet, or perhaps emerges boldly on a muddy trail. It forages, usually with its beak held open, by poking in trash and flicking aside the debris. Sometimes it is found with antbirds attending army ants. Neither bird nor man is prepared for a sudden meeting, which usually results in a delayed reaction of

mutual surprise. Even if aware of the oncoming observer, the bird does not necessarily flee. In fact, it may unaccountably permit a cautious approach within 10 feet before walking to safety in the undergrowth. It never seems to take wing except, say, when flushed by dogs, it rises to a low branch. But in any situation, whether observed openly or from concealment, the nervous bird acts as though it anticipates betrayal. The short black tail, cocked like that of an antthrush (*Formicarius*), twitches or vibrates, the head with its bleeding-red eye looks about in starts, and the suspicious bird moves indecisively, with halting steps.

Its striking cry is heard most often at dawn and toward dusk or even after nightfall. It consists of a consecutively repeated galline cackle seemingly given in chorus (though the bird is almost always met singly): "póp-tiyih póp-tiyih co-co-co-co-co" or "chittycó chittycó caw-caw-caw-caw." The gabbling first portion resembles the rattling call of the woodpecker *Phloeocoastes guatemalensis*, while the several "co" 's or "caw" 's, low-pitched and steady, given as though antiphonally, possess a special character. The quality and pattern are captured in part by the bird's local names, "cocaleca" and "cacaleo." This very variable call can also sound like another vernacular name, "ponéh ponéh" (or "póneh póneh"), jumbled with cackles and "co" 's. A common ejaculation, "ook" (as in "look"), "uk," "kwuk," "k·luk," or "kruk," often reveals the presence of a nearby bird. Also given are a clucking cackle and muffled tomtom sounds.

The two species of *Aramides* in Costa Rica are fowl-sized terrestrial birds much larger and heavier than any other land rail in the country. They have the head quite large, the neck rather thick, the yellowish beak straight and strong, the red legs sturdy, and the tail very short. Taken as a whole, the unbalanced proportions lack harmony, and the birds somehow look unfinished. *Cajanea* is widespread and common; *axillaris*, very rare.

***Aramides axillaris* Lawrence**

RUFIOUS-NECKED WOOD RAIL

RANGE: Mexico to western Ecuador and the Guianas.

No advance in knowledge concerning this bird in Costa Rica has been made in the past half century. Bangs (1907a, p. 178) reported "in the Underwood collection, lately purchased by John E. Thayer Esq., a young example of *A. axillaris*, nearly full grown but with the under parts still brownish slate-color, from Costa Rica. Unfortunately the label has nothing more definite than 'Costa Rica.' " Carriker (1910, p. 408) stated without explanation that this specimen was taken "probably at Carrillo," and "since the above record was published I am informed that a slightly immature male of this species was taken by C. F. Underwood at Lepanto." Carrillo is situated at about the transition between the tropical and subtropical belts on the northern slope of the Cordillera Central. Lepanto is a coastal locality on the peninsular side of the Gulf of Nicoya, opposite the town of Puntarenas. I did not meet this species; neither did Carriker nor, apparently, Austin Smith. I could only suspect its possible presence in a forested swamp in the northeastern lowlands, where a few times I heard an *Aramides*-like call different from that of the common *cajanea*, which was present at the same site.

***Porzana carolina* (Linnaeus)**

SORA

RANGE: Breeds in North America; winters from southern United States to Peru and eastern Brazil, also in West Indies.

The migrant Sora rail is, in my experience, a rare visitant. Carriker (1910, p. 409), however, found it numerous in winter along the Old Line railroad at the northeastern base of the Cordillera Central and in October at Turrúcares on the western tropical-belt portion of the central plateau. Besides the above localities, it has been recorded several times from the subtropical central plateau, and I saw it a few times at the pond of the Inter-American Institute of Agricultural Sciences near Turrialba. The species arrives by early September and leaves probably in March or April. Evidently it prefers marshy lagoons and reed-bordered ponds as well as, according to Carriker, "wet grassy tracts of the rice-fields" (at Turrúcares). It may come out of the reeds a few yards onto exposed muddy margins in the open marshy or swampy habitat. Afoot it

flicks its tail on the upjerk, and it flies with short, flattened beats.

***Laterallus albigularis* (Lawrence)**

WHITE-THROATED CRAKE

RANGE: Extreme southeastern Honduras to western Ecuador.

***Laterallus albigularis cinereiceps* (Lawrence)**

RANGE: Extreme southeastern Honduras to northwestern Panama.

***Laterallus albigularis albigularis* (Lawrence)**

RANGE: Southwestern Costa Rica to western Ecuador.

The little White-throated Crake is distributed over most of the country, except for the northern two-thirds of Guanacaste, mostly at low elevations. The Caribbean *cinereiceps* is abundant in the lowlands, less common in the subtropical belt where it fronts the central highlands. It has been recorded from the central plateau, but there it is scarce and local. The Pacific *albigularis* is relatively uncommon except in parts of the Golfo Dulce lowlands; it ranges from the Tempisque basin locally southward and is not known above the tropical belt. The species is largely terrestrial and inhabits wet fields, heavily grassed banks of ditches and canals, pond edges, overgrown stagnant shallow streams, and drying stream beds. It does not enter woodland at all or water beyond wading depth. Sometimes it perches in low bushes and reedy tangles.

The bird is caught sight of once to every hundred times heard. Narrow-bodied and small, it moves about completely concealed amid the stems of matted grass and can disappear like a mouse into the thickest cover. Beside the feet of the observer, who is tantalized by its whinny, the bird is as safe as an eagle high in the air. Yet the observer is bound to see it occasionally if only because of its abundance, especially on the Caribbean side. For instance, the bird may stop while crossing a trail or creeping out of a pile of brush. Flushed, it flies poorly, with dangling legs, before dropping into a convenient clump; it is seldom flushed a second time.

It makes several distinct calls. The most common is a drawn-out falling churr almost identical to the whinny of the Least Grebe

(*Podiceps dominicus*), the habitat of which dovetails that of the rail in places. Hence the call issuing from grass can be safely assigned to the rail, but not when open water is nearby too. It also resembles the protracted churr of the Sooty Spinetail (*Synallaxis brachyura*), the habitat of which may include part of that of the rail, but the call of the spinetail is rougher and not watery. Another cry is a sharp "cheep" difficult to differentiate from that of a number of small songbirds unless its metallic timbre be noted. Another is a manakin-like "p-seéer." In addition, the bird makes a piercing "tchip tchip tseeéyur," a warbler-like "stchip" or "tchup," and a shorter "chp."

[*Laterallus ruber* (Sclater and Salvin)]

RUDDY CRAKE

RANGE: Mexico to Costa Rica.

During the first week of May, 1955, at Bajura de Guachipelín, Hacienda Miravalles, Guanacaste, I observed this species on two occasions. The Bajura is a large marsh that occupies a depression in rather level ground amid scrubby cattle lands in the upper tropical belt near Miravalles Volcano. Some distance from the marsh I saw the two birds venture along the edges of thickety low growth bordering a recently charred field covered with stubble. They were evidently not shy, as I watched them from perhaps 10 yards off. One of the birds uttered a "stchup" hardly different from that of the congeneric *albigularis*. From the marsh itself I heard at times a churring whinny similar to but seemingly lighter than that of *albigularis*. This is the only Costa Rican report.

The congeneric *albigularis* of nearly country-wide distribution seems not to have been recorded north of the Tempisque basin, whereas the Ruddy is surely present locally elsewhere in the Tropical Dry Forest. As I noted at the time, the birds had short, rather heavy beaks. Because of this character, in addition to zoogeographic considerations, I assume that they belong to *ruberrimus* of El Salvador and Nicaragua.]

Gallinula chloropus (Linnaeus)

COMMON GALLINULE

RANGE: Nearly cosmopolitan (except Australia).

Gallinula chloropus cachinnans Bangs

RANGE: Breeds from southern Canada to Panama and in Galapagos Islands; northern birds winter from southern United States to central Panama (American Ornithologists' Union, 1957).

The so-called Common Gallinule is seldom encountered in Costa Rica. It is dispersed very locally in lowland swamps on both slopes, including the Tropical Dry Forest, and on the subtropical central plateau. But even at suitable habitat it is absent far more often than present. Though I found it a little north of Santa Cruz de Nicoya, I did not see it in the typical Guanacaste lagoon country at the head of the Gulf of Nicoya. A small breeding colony is well established at the pond of the Inter-American Institute of Agricultural Sciences near Turrialba; the original colonists consisted perhaps of one or two pairs that arrived from an unknown locality probably in the eastern lowlands. There is still no record from the southeast or southwest. The species prefers ponds and fresh-water lagoons with floating vegetation and reedy margins, foraging amid the former and roosting and nesting in the latter.

It is not nearly so excitable or noisy as its partially sympatric, habitat-sharing neighbor, the Purple, nor do individuals chase one another about so much. Yet when the occasion for dispute arises, the Purple gives way to the Common. In general appearance the Common is cootlike or ducklike, the Purple rather rail-like. The Common is heavier bodied, deeper chested, not so "leggy," and its contours embody a pleasing roundness of line absent from the Purple.

The Common Gallinule flies little. It does not climb among the reeds and seldom perches in vegetation during the day. Though it walks well on solid ground or in shallow water, it progresses poorly over floating plants, sinking easily; it prefers to wade or to swim. The swimming bird pumps its head and neck, holds its wing tips crossed gracefully somewhat above its back, and secures its food from the water surface rather than from the aquatic plants. Examining a mat of decaying vegetation, the standing bird sometimes uses its feet to hold down the portions already probed by the beak.

The chick, to assist the voice in attracting

attention, raises its bare red wing ends to behind the head and vibrates them rapidly. This waving of the "hands" in the manner of a cheer leader is rendered still more peculiar by their resemblance to the open clipper of a crab or to little red mittens with the thumb pointing downward, the rest of the hand upward. The parent responds by tendering food in a gentle gesture, and the chick scrambles to snatch the proffered item from the patiently poised tip of the beak of the adult bird. Food may also be popped into the mouth of the baby. An immature individual may help the parents feed the brood, and a chick may become attached to this assistant, at least temporarily. The chicks follow the parents about, but swim and of necessity clamber rather than walk when trying to pass from one floating pad to another.

The voice of the adult, whether a deep "kuk" or a trumpet-like cackle or a fowl-like clucking, is impregnated with a reedy quality a little deeper than that of the Purple Gallinule. The immature bird may utter an odd "k-arr." The weak call of the chick is a scratchy, two-note sound, of which the first note is shorter, smoother, and lower pitched than the second.

***Porphyryla martinica* (Linnaeus)**

PURPLE GALLINULE

RANGE: Southeastern United States through West Indies, and southern Texas to northern Argentina.

The Purple Gallinule is found mostly in the swampy lowlands on either slope; scattered groups are possibly still present on the central plateau. Though seldom encountered, it is more common than the Common Gallinule. The habitats are mostly alike: lagoons, ponds, marshes, and river mouths where the margins are overgrown with herbage and shrubbery and the surface of the water with floating plants. The bird shows a decided preference for heavily overgrown swamps to grassy marshes of more open expanse. It also occurs in wet wild-plantain jungle. As with the Common Gallinule, I have not seen it in the lowland Guanacaste lagoon country, and it avoids open or swiftly flowing water.

In both gallinules the concentration of individuals in a favorable locality indicates a

pooling of interests rather than true community life. Where both are present, they mingle with each other and also with jaçanas, roam freely within the habitat, and show individualism in behavior. Though normally secluded within its swampy surroundings, this species, like the Common, becomes very tame when unmolested and ventures upon the banks or beyond them to adjacent meadows, even to lawns. The chicks, unlike those of the Common, apparently do not show themselves in the open until well grown.

Both gallinules when startled usually try to reach safety by running with the assistance of beating wings. When taking flight, both are capable of rising directly, but not far, out of the water. The legs dangle at first, then trail behind as smooth flight is attained; they are held bent and drawn close to the body in a short flutter. Both species alight with the legs directed far forward. The Purple flies more readily, more easily, and more buoyantly than the Common, and it can come to sudden stops on lily pads or reed stems; the Common lights on the water or, if on pads, stumbles off them. The Purple, unlike the Common, regularly climbs among reeds and also perches on them, albeit awkwardly. It almost never swims, but walks expertly on floating plants, from which it obtains its food rather than from the water. Habitually it turns a pad over with its beak, then holds it down with a foot while peering at the under side.

The Purple has a flat-headed profile, and its neck shows an ungainly croplike bulge before it joins the narrow chest; the Common has a rounded head and an evenly curved neck that flows smoothly into a fine, broad chest. In the Purple, the rounded blue shield is distinct from the beak, lies flat to cover most of the crown, like a bald spot, and extends far back of the eyes; the red shield in the Common seems to form part of the beak and is bordered by the feathered crown directly above the eyes. In the Purple, the white patch under the tail resembles a loose-webbed, fluffy ball; in the Common, it is medially black and the adherent feathers lie smoothly flat. The body of the Purple is rather narrow, with a hint of a stoop and a "leggy" look, so that what the bird gains in brilliance it partly loses in lack of grace.

Its reedy cries include fowl-like cackles, a "chip" like the noise of a bicycle horn or a falsetto toot on a seventeenth century trumpet, a gull-like note, and a cry much like that of the Limpkin. The Purple Gallinule is a noisy, argumentative bird, unlike the sedate Common.

***Fulica americana* Gmelin**

AMERICAN COOT

RANGE: Canada to Ecuador; West Indies.

***Fulica americana americana* Gmelin**

RANGE: Breeds from Canada to Nicaragua; northern birds winter south to Panama.

The status of the American Coot in Costa Rica seems to be that of a winter visitant. There have been no observations of breeding birds or, to my knowledge, of summering individuals. It is present in fair abundance in the few places where it finds suitable conditions, as at ponds and lagoons. At such scattered sites it occurs on the central plateau, the pond of the Inter-American Institute of Agricultural Sciences near Turrialba, the Sarapiquí lakes, and elsewhere on the slopes that lead to the central highlands. It is especially common on open lagoons in lowland Guanacaste, probably also in the Río Frío region, where I found several individuals still present in early April. In addition, Carriker (1910, p. 412) shot a bird in the lagoon at the mouth of the Río Matina north of Puerto Limón. This last seems to be the only report from the tropical belt along the eastern portion of the Caribbean slope; probably the species winters in good numbers in the coastal lagoons northward to Nicaragua. It is still unrecorded from all the southwest or the Pacific northwest other than the local concentration at the head of the Gulf of Nicoya.

The wintering bird apparently prefers fairly large extensions of calm water, usually with some aquatic vegetation. Swimming, it dabbles, immerses its neck completely, or tips like a duck. Seldom have I seen it dive in Costa Rica. It may forage from a standing position on mucky mats, as does a gallinule.

FAMILY HELIORNITHIDAE

***Heliornis fulica* (Boddaert)**

SUN-GREBE

RANGE: Southern Mexico to Bolivia and extreme northeastern Argentina.

The Sun-grebe in Costa Rica seems to be primarily a Caribbean species and is virtually confined to the tropical belt, almost exclusively in the flat lowlands. I found it common only along the Río Frío, perhaps because the people there consider its flesh poisonous, but it is also met more or less regularly along other rivers, such as the lower Sarapiquí. It has not been recorded, however, south of Puerto Limón, though it probably occurs there. Carriker (1910, p. 413) collected a pair at Laguna Grande de Bonilla, on the lower eastern slope of Turrialba Volcano, where I did not see it during visits in 1951 and 1952. On the Pacific slope I found it only twice, at a lagoon of the Río Cañas, north of Santa Cruz de Nicoya in the dry-forested northwest, and on a drainage ditch in a banana plantation in the wet Golfo Dulce region of the far southwest.

Though the species is met most often in wooded areas, I associate its occurrence with the presence of a watercourse rather than heavy forest. For the most part, it frequents slow-moving lowland rivers, stagnant streams and canals, fresh-water coastal lagoons, and open-water lakes without entangling aquatic vegetation. Well inland at the Río Puerto Viejo, for instance, it frequents not only the sluggish tributary streams but also the often flooded, swiftly flowing river. I have seen it usually singly, sometimes in two's, and occasionally in three's.

In general, my observations complement those of Richmond (1893, pp. 530-531) rather than Carriker's (*loc. cit.*). The bird is almost always seen swimming or resting afloat, occasionally perched on a limb or stub sticking out of the water or along the bank. In the water it appears broad and squat, its long tail lying flat on the surface, like a scallop-fringed, white-tipped train. Its head is held horizontally on the slender vertical neck, and the tips of its short wings are crossed well ahead of the hindquarters. The swimming bird propels its feet much more rapidly than it ordinarily pumps its head and neck. When it is struggling against a strong current, its stiff and strained head and neck do not pump at all, and the bird is obviously pushing with effort as its body veers from side to side. In contrast to other observers, I have not seen it dive during the course of

many encounters, including those in which the bird was suddenly surprised. Instead it often swims away in an agitated manner, making slow progress even in calm water, or takes flight.

Normally the swimming bird hugs the vegetation-covered margins and pecks at invertebrate prey on steep mossy banks, half-submerged branches and logs, or accumulated debris, as at snags or tiny islands. Traveling upstream it makes use of countercurrents and quiet water at either bank, especially in stretches having heightened flow. Crossing from one side to the other, the bird leaves the protection of the bank and swims out into the stream. If pushed back by the current, it either flutters along the surface or flies low, with legs raised, easily and swiftly toward the opposite bank. It settles in a smooth glide and immediately resumes its swimming. Should it happen to light in a powerful current, it flies again to another stopping place. But even when straining against a current, the bird does not necessarily fly as long as it makes some headway. The species undoubtedly flies sufficiently well for its needs. Indeed, a bird that I had inadvertently cornered between a steep bank and a high ledge rose directly from the water with the lightness of a dove to fly over the obstacle.

An individual bird, or a pair, seems to occupy a territory or home range along part of a river and its tributary streams, which it patrols daily. Regularly at afternoon twilight, at least during part of the year, I saw a bird or two returning upstream to a special spot overhung by leafy branches. Having arrived at the site, the bird kept looking up, as though calculating distance, then leapt straight up, arrow-like, some 3 or 4 feet to the branch on which it was going to spend the night. If the bird fell back from an unsuccessful attempt, it swam onward a bit before trying again.

The only sounds I heard were a "chip-chip" (between "chip" and "chep") and a strong, nasal, unclear "ooép-ép."

FAMILY EURYPYGIDAE

Eurypyga helias (Pallas)

SUN-BITTERN

RANGE: Southern Mexico to Bolivia and Brazil.

Eurypyga helias major Hartlaub

RANGE: Southern Mexico to western Ecuador.

The Sun-bittern is distributed scatteringly through the humid-forested portions of both slopes, from the lowlands to at least the middle of the subtropical belt. On the Caribbean side it seems to be more common in the foothills of the central highlands than in the flat lowlands, and it overlaps the Pacific-facing forested slopes of the Guanacaste Cordillera; it is almost surely present, too, along the Cordillera de Tilarán. It is unknown from the Tropical Dry Forest, except for a specimen taken at an elevation of only 400 feet far to the north at Hacienda El Pelón; this bird probably belonged to a population inhabiting the neighboring humid-forested continental divide. Elsewhere on the Pacific side it has been recorded from the humid mountains that border the southern edge of the central plateau, Pozo Azul de Pirrís in the lowlands south of the entrance to the Gulf of Nicoya, and at only two localities, both at lower subtropical elevations, in the General-Térraba region of the far southwest (Skutch, 1947b), where possibly it is more common than supposed. For the most part it seems to prefer hilly country, where the rivers and streams are necessarily swift-flowing and generally strewn with rocks and boulders. It also occurs at sluggish muddy streams in the flat lowlands and at forested swamps. It is found usually alone, sometimes in two's, infrequently during the year at any one place.

This peculiar bird is unusually proportioned and has its main axes horizontal and vertical. The body, with its elongated hind-quarters and long tail, is borne parallel to the ground. Its inordinately slender neck rises vertically, its narrow head and beak extend, steplike, horizontally forward, and its legs, placed at the center of the body, are perpendicular to it; the legs are relatively short, more like those of a shore bird than a heron, and the neck is about as long as the legs. The legs are bare of feathering, as in water birds generally, to their insertion, yet I have seldom seen the bird wade. Though its hallux is short, as in shore birds and rails, it may perch in trees like a heron. It walks carefully with slow steps or quickens to a broken pace that coincides with the bobbing of the head; I have not seen it nod. I also

observed an individual walking daintily along a log projecting over a swift stream. The usual gait is very odd, because the bird stretches out its neck, then walks its body a step or two to the head, which remains fixed until the chest rests beneath it.

Frequenting the rocks and beaches of streams, investigating the sides of stones set in accumulations of earth, entering the adjacent undergrowth on the wooded banks, sometimes passing along an open trail near a stream, the bird is wary yet not particularly shy. It forages typically by gleaning moss-covered boulders, leaping from one to another, and I have seen it pick at moss hanging down from a limb on which it was standing. Crouched, the bird may pose like a pointer and slowly bring its legs closer until, heron-like, it darts at the item of interest, then dipping its beak to the water seems to swallow a sip. At rest, this strange bird may open and close its beak as if taking breaths of air. Standing on a branch, it may weave its hindquarters uncannily from side to side while holding its head motionless. Once I saw an individual with its white-spotted lesser wing coverts slightly raised so that they looked like a pair of white-tipped, five-fingered hands; it seemed to be alone.

The bird makes regular use of its broad wings, patterned like a sunburst; hence it is well known to some of the country people as "el sol" or "sol y luna." Unfortunately the same people also claim that it is good to eat. Flying readily, easily, and lightly, it also utilizes its wings when leaping up to, down from, and among boulders. Ordinarily the bird folds them immediately on landing, but after a rain it pulsates the folded wings, as does a goose, and at the same time may half-open and shut them as though to dry.

The sounds I heard it make are a trogon-like "cow cow," a weak reedy rattle or trill, descending somewhat while slightly intensifying, and a cry which close at hand sounds almost exactly like that of a distant Boat-billed Flycatcher (*Megarhynchus pitangua*).

FAMILY JACANIDAE

Jacana spinosa (Linnaeus)

MIDDLE AMERICAN JACANA

RANGE: Southern Texas to western Panama; Greater Antilles.

Jacana spinosa spinosa (Linnaeus)

RANGE: Southern Texas and eastern Mexico to western Panama; Greater Antilles.

Colonies are present over most of the country, from the lowlands of either coast to subtropical elevations along the interior highlands, including the central plateau region. The species is most common in the tropical belt, which offers suitable environments more extensively than do the higher elevations. It inhabits ponds, lagoons, swamps, and marshes, especially those with flourishing aquatic vegetation and protectively overgrown margins.

Jacanas are individually ebullient, quarrelsome, and active. They are not shy about appearing in the open on the plant-covered water where they spend most of their time, dashing about every which way. Birds venture into neighboring meadows where, however, they band loosely and fly as a flock when frightened. If suspicious of danger when foraging in tall grass, they may pull themselves almost vertically erect, with legs straightened and neck stretched high, and they may take a few short, stiff-legged steps while maintaining the aloof dignity of the unusual pose.

The jacana seems never actually to enter the water except when, wounded and pursued, it will dive. Ordinarily it does not wet its legs more than an inch or two above the toes. It progresses steadily and rapidly over the floating vegetation, hopping from pad to pad and fluttering momentarily over open water. Usually the head is kept low as the bird searches intently for food, which it picks up with the body tilted downward at a 45-degree angle. Its head bobs at each step, and the bird repeatedly breaks the rhythm with a few faster off-beat bobbings. At each bob the head almost bumps the back, closing the sharp hollow between. The bird flies lightly and easily on an even keel, usually alternating flappings and glides, and its yellow wings, quite broad and rounded, twinkle like those of a butterfly. In a short flight the legs dangle, but in longer ones they trail behind, with upturned toes. The bird sails with the ease of a heron and may skim the surface for good distances without moving its slightly bowed wings. It often flutters or hovers, preparing to land, and as soon as afoot holds its wings for a long moment almost vertically raised.

Its pencil-like legs resemble right-angled rods bent at the middle and bare to their insertion. The position of the "knee," more than any other feature, accounts for the jaçana's peculiar mannerisms and posture. At each step the lifted "knee" comes close to touching the pointed end of the hindquarters and seems to jack them up. Its legs, set far to the rear, give the illusion that they are moving backward as the bird moves forward. The vague impression of a teeter, a momentary pause to shift balance, accompanies every step.

Its voice has a characteristic irritated rasp whether in the single notes, the chickering chatter, or the typewriter-like clacking. At a distance some calls resemble the chinking of a Groove-billed Ani (*Crotophaga sulcirostris*) or the raspy twitter of a Tropical Kingbird (*Tyrannus melancholicus*), but they are substantially harder and lack the reediness so typical of the cries of a gallinule.

FAMILY HAEMATOPODIDAE

Haematopus palliatus Temminck

AMERICAN OYSTERCATCHER

RANGE: United States and West Indies to Chile and Argentina.

Haematopus palliatus palliatus Temminck

RANGE: East coast of United States to Brazil and Pacific coast from Isthmus of Tehuantepec to Colombia.

Haematopus palliatus frazari Brewster

RANGE: Pacific coast of Mexico; recorded from Pacific coast of Costa Rica.

The status of the American Oystercatcher in Costa Rica is uncertain. The Pacific slope supposedly lies within the breeding range. There is no evidence of nesting, but observations of this conspicuous large bird are admittedly haphazard and scant. The species does occur, so far as known, only on the Pacific coast and mostly in the period of the fall migration. At any rate, nominate *palliatus* can then be counted on to turn up regularly in small numbers with other clearly transient shore birds. It idles along, as do the others, always in the same direction, southward. This form has also been collected once in summer (M.N.C.R. No. 5118, July 4, 1890)

and once in winter (Wm. Beebe Collection in the American Museum of Natural History, February 4, 1938). The race *frazari* is known in Costa Rica from a single fall record.

I have seen this oystercatcher almost without exception in two's, always a single pair at a time at any one place, making their way along the beach on foot, either slowly or with moderate speed, perhaps for miles on end. The birds stop from time to time to feed on crabs or other creatures on the lower beach left behind by the wash or, wading belly deep, probe to the full length of the beak as the head disappears under water. Objects seem to be picked up only when the beak is held vertically. Having arrived at the end of a stretch of beach, the birds dawdle, resting on their "knees," crouching on the sand, or simply standing about. They take flight as a rule only to cross river mouths.

Flight is slow and heavy, close to the water surface, the broad wings fluttering rather than beating, and the strikingly revealed black-and-white pattern as well as the long red beak identifies the bird immediately. Afoot the bird can be recognized by silhouette alone. Its stout neck rises like a column from the nearly horizontal, heavy body, its compressed long beak with the tip chopped off projects downward at a 45-degree angle, and its sturdy legs are relatively much shorter than, for example, those of a curlew or a Willet. Its voice is employed freely and, like its appearance, attracts attention. The loud, rather squealing "reek," "week," or "oo-eeek" may be uttered once or several times, always when the bird takes flight.

FAMILY CHARADRIIDAE

Squatarola squatarola (Linnaeus)

BLACK-BELLIED PLOVER

RANGE: Breeds in Holarctic Region; in New World winters from southern United States to southern South America.

The migrant Black-bellied Plover is fairly common in the spring (to at least the second week of May) and the fall, when it is regularly met singly or in two's or three's, seldom in larger parties. In the winter it is much less abundant, yet can be seen from time to time. It is mainly attracted to spits and tidal flats at river mouths and embayments, but it also patrols the unbroken beach, walking well.

Generally it takes flight at the slightest provocation. Sometimes a breeding-plumaged individual practices a peculiar postured walk with its head lowered to the level of the back, which in turn is inelegantly humped, while the pit of its black chest bulges toward the ground. This display produces no noticeable effect on its neighbors.

Most birds are seen in Costa Rica in the pale winter plumage, but individuals occur in all stages, including full breeding dress, in spring and fall. Its size makes this plover one of the conspicuously larger birds on the beach. Its call is a drawn-out, slurred whistle with falling accent, sort of nasal, quavering, mellow, and gentle, which I transcribed variously as "pee·éer," "squee·er·érr," "squée·ir," and "squée·yeeer," as well as a skewy "squeer." It is heard often along the Costa Rican beaches. It differs noticeably from the shrill cry of the Golden Plover.

***Pluvialis dominica* (Müller)**

AMERICAN GOLDEN PLOVER

RANGE: Breeds in Holarctic Region; in New World winters chiefly in southern South America.

***Pluvialis dominica dominica* (Müller)**

RANGE: Breeds in northern North America; winters chiefly in southern South America.

The migration route of the American Golden Plover to and from the South American pampas largely bypasses Central America via the Antilles. The bird is uncommon in Costa Rica, where occasional transients apparently turn up regularly on the Caribbean coast, sometimes on the Pacific, and even on the central plateau or above it at water-filled dips in the mountain pastures. Irregularly an individual may remain for the winter. Its cry, a shrill "squeerk" unlike the mellow, musical, two- or three-syllable whistle of the Black-bellied Plover, is of the sort given by a frightened bird.

***Charadrius semipalmatus* Bonaparte**

SEMPALMATED PLOVER

RANGE: Breeds in northern North America; winters from southern United States to

Chile and Argentina.

This plover occurs in large numbers as a passage migrant as late as the second week of May in the spring and again in the fall, less abundantly in the winter; a few probably abnormal individuals may stay through the summer. It keeps mostly to the seashore, particularly at river mouths with exposed flats. Individuals also occur at coastal estuaries and lagoons and farther inland on sandy or muddy beaches of lowland rivers. During migration it is seen singly, in small groups, and in good-sized tight flocks; during the rest of the year, as scattered individuals.

The habits of the Semipalmated hardly differ from those of the other small members of the genus: *collaris*, *alexandrinus*, and *wilsonia*. The bird stands motionless on straight, slender legs, holding the head and bill level instead of directed downward as do many small sandpipers, and perceptibly nodding at intervals its seemingly neckless head. It generally progresses like a round-bodied small thrush in a series of quick little steps that come to a halt so abrupt that the head bobs. Sometimes it walks steadily and rapidly, with a crisscrossing effect, like a Sanderling. Though at times wetting its toes at the edge of the retreating surf, it avoids wading. It prefers the wet sand near tide line, but it also forages on the dry, littered, upper beach. It picks up prey suddenly, as though on impulse, by a quick movement of the head without bending its "knees." When disturbed it usually walks away instead of taking flight, yet may permit the observer a close approach. The flight of a single bird, with frequent changes of direction and irregular slight accent on the whipping downbeats, is rather dovelike. Packed in flocks it flies differently, with shorter, quicker, almost fluttering strokes, and the fickle maneuvers of the birds en masse respond, as it were, to a central intelligence that guides the members as one.

The musical sweet "churwéet" is mistaken for the note of no other shore bird in Costa Rica. Often it provides the only means for distinguishing this species from *wilsonia* at a distance or in flight and betrays an individual camouflaged on the sand. Sometimes it is coarsened to a squeaky but still recognizable "chooóek" or "squirúrk."

Charadrius alexandrinus Linnaeus

SNOWY PLOVER

RANGE: Warmer parts of North America, Europe, Asia, Africa, and western South America; in New World winters south to Venezuela.

Charadrius alexandrinus nivosus (Cassin)

RANGE: Breeds in western United States; winters along Gulf coast of United States and Pacific coast of United States and Mexico; recorded in Costa Rica.

The inclusion of this tiny plover in the Costa Rican avifauna has been due to Zeledón's listing of a specimen in his private collection (1882, p. 30). Its whereabouts is unknown, but Ridgway probably saw it because he assigned it to the race that breeds in western United States [1919 (1901-1950), pt. 8, p. 137]. I observed the species only once, in the latter part of September, 1954, at the mouth of the Río Parrita on the Pacific coast. It was a winter-plumaged individual in the company of other southward-bound shore birds that frequented a flat exposed by the tide.

Charadrius collaris Vieillot

COLLARED PLOVER

RANGE: Southern Mexico to Chile and central Argentina; Lesser Antilles.

The neotropical Collared Plover is apparently a resident species nearly confined to the shores of both coasts. According to Carraker (1910, p. 417), it also occurs sparingly "along the rivers up to an altitude of nearly 1,000 feet." I have seen it only on the beaches, either singly or in small parties, often mingling indiscriminately with other ringed plovers. In mixed groups the bridled Collared is easily the brightest, most contrastingly marked, and the most elegant, and the way several birds stand around at attention, often facing the same direction, suggests sentinels on guard. Its running walk is perhaps the fastest and most accomplished of that of any of the small plovers; the moving bird always seems to be in a hurry. Also, it nods and teeters slightly, perhaps more frequently than do the other members of its genus. Sometimes a bird walking rapidly while drawn erect or two individuals con-

fronting one another have the sides of the white under parts fluffed out laterally. Facing the observer the bird looks broad and flat, as though hiding behind a starched shirt front; from behind, the brown body seems to be pressing against a white disc. Whatever its attitude, the bird appears dainty and fastidious.

Its slightly varied notes are sharp and unmusical, such as those of several other shore birds. Crudely transcribed, they include a short "pip" or "pyip," often reiterated; a weak "peet" or "pit" or "wit"; a soft "tchrip" or "chirrip," like that of *wilsonia*; a chirpy, cricket-like "chitit"; a "tsick-tsillick" not unlike some notes of the Sanderling.

Charadrius vociferus Linnaeus

KILLDEER

RANGE: Breeds from southern Canada to Mexico, also in Peru and West Indies; winters to Chile and Venezuela.

Charadrius vociferus vociferus Linnaeus

RANGE: Breeds in North America; winters southward to northern South America.

The Killdeer is a common wintering migrant over much of the country, from both coasts to the central plateau. Unlike other Costa Rican members of its genus, it does not inhabit the beaches, but prefers grassy pastures and overturned ground in the interior. It may be found scattered almost anywhere in cleared or open areas, often close to habitations and corrals. It is common in the Guanacaste cattle country, spreads over the entire deforested central plateau to its Caribbean approach above the tropical belt, and occurs in fields and agricultural lands in the southwest. Its Caribbean distribution is spotty. Usually it is seen in small bands. During its Central American sojourn, the Killdeer is as noisy and its habits seem the same as when summering in the north.

Charadrius wilsonia Ord

WILSON'S PLOVER

RANGE: Breeds from east coast of United States through West Indies to Venezuela and British Guiana, and from Gulf coast of United States and northwestern Mexico to Peru; winters to Peru and Brazil.

Charadrius wilsonia wilsonia Ord

RANGE: Breeds along coasts of eastern and southern United States to British Honduras and West Indies; winters to Costa Rica and from British Guiana to Brazil.

Charadrius wilsonia beldingi (Ridgway)

RANGE: Pacific coast from southern California to Peru.

Wilson's is a widely distributed New World plover that occurs in Costa Rica as a breeding resident, a winter visitant, and a passage migrant. Through one of the most common of the shore birds during the several months of migration, when it can be found singly, in small groups, and in large flocks, the species seems not to have been recorded prior to the 1920's. It is individually dispersed and less plentiful during the rest of the year. In early May on the Pacific beaches near Dominical, I found *beldingi* scattered about in pairs, some with one-third-grown, downy young. The adults were all visibly perturbed and kept calling and running about in order to distract me from the young birds.

The habits and habitat of the species seem almost identical to those of *semipalmatus*, with which it associates freely and equals or perhaps surpasses in numbers. Possibly its larger bill enables it to handle a type or size of food beyond the effective capability of *semipalmatus*. Also, in rather marked contrast to *semipalmatus*, it tends to select the higher, drier portions of the sloping beach. If this be so, then the lighter shade of the upper parts of Wilson's, which matches bleached sand, and the darker back of *semipalmatus*, the color of wet sand, lend support to the supposition. Crouched in shallow hollows, such as the imprints of a person's footsteps, Wilson's Plover quite fades from sight.

Its usually sharp and unpleasant, characterless voice is unlike that of the melodiously plaintive *semipalmatus* and more like that of *collaris* or the Sanderling. Its note, "tsip," "tseep," "chit," "chitdit," "chipchip," "chitarit," or a hard "chiklik," is variable in utterance and quality. Yet I have heard from breeding birds a musical "chwit" and a sharply whistled "whit" or "wheest." A flock may produce a babble of "squip"'s or "jeet"'s which in conjunction sound

cricket-like or vaguely like a traffic whistle. The birds also give a guttural bicker.

FAMILY **SCOLOPACIDAE****Bartramia longicauda** (Bechstein)

UPLAND PLOVER

RANGE: Breeds in North America; winters in southern South America.

The Upland Plover is a very uncommon to rare transient recorded mostly from the central plateau in the fall (September–November). I know of only two spring records (April), one each for the central plateau (Alajuela) and the southwest (delta of the Río Térraba). Elsewhere, Carriker (1910, p. 421) recorded a bird from Guácimo (on the lower Caribbean slope), where he shot it in a newly plowed field. I saw a single bird in a sandy field beside the beach between the Río Parrita and the Río Palo Seco on the Pacific coast. Apparently the species prefers open grassy fields and pastures in Costa Rica as in the north.

Numenius phaeopus (Linnaeus)

WHIMBREL

RANGE: Breeds in Holarctic Region; in New World winters to southern South America.

Numenius phaeopus hudsonicus Latham

RANGE: Breeds in northern North America; winters from southern United States to Chile and Argentina.

A common spring and fall migrant along both coasts, the species remains in fair numbers through the winter, and evidently a few stay through the summer (Carriker, 1910, p. 418). It frequents the beaches, estuaries, the coastal lagoons, and a rare individual may turn up on the central plateau. Lone birds are usually met along the open beach; small to fair-sized flocks, on spits and flats at river mouths and embayments. Sometimes it forages in nearby fields with various ringed plovers and Spotted Sandpipers.

The members of a flock keep fairly close together, and with them may be several Willets. Their resting attitudes are varied, as some stand normally, others crouch, and others rest the bill on the back. If disturbed they shuffle restlessly but can be stalked closely before being frightened into flight.

Isolated individuals are much more shy. When the bird walks slowly, its head bobs; at a faster pace it is held steady. At times a bird scurries with head brought down to body level, but generally it shows a good length of neck. I have not seen this species nod and teeter as do some other long-legged sandpipers. In flight, the members of a band follow either directly behind one another or in echelon. The birds fly quickly and easily on a level plane, seldom erratically, and they may sail smoothly on bowed wings. On alighting, they may hold their wings raised a moment, but such an attitude is by no means the rule.

The most common cry of this curlew is a rapidly repeated "kü," with or without an introductory "wick," varied at times to a series of "whi"'s, and often it has the quality of a throaty rattle or a cackling trill. It is uttered freely, mostly during flight and often after dark. The bird also makes a cricket-like or Spotted Sandpiper-like "pidiwíp," and so on, that, when pitched lower, changes in character to a froglike croodle or gargle. A flock may indulge in this peculiar crooning, from which emerges at times a noise such as is produced when a person sits down on a bedspring.

[*Limosa fedoa* (Linnaeus)]

MARBLED GODWIT

RANGE: Breeds in central North America; winters from southern United States to Chile.

At the mouth of the Río Palo Seco, about halfway down the Pacific coast, I observed what was probably the same winter-plumaged individual on three different days at the end of the third week of September, 1954. Twice it was alone and once in a tight company of about 20 Whimbrels and a couple of Willets. This is the only Costa Rican report of the Marbled Godwit, but, when it is considered how much farther south it spends the winter, it might yet prove a regular passage migrant and, possibly, an occasional visitant.

In a mixed group, when many birds have the bill buried in the feathers of the back, it resembles a Whimbrel in the variegated brown of its upper parts, not the smoothly grayish Willet. Otherwise its distinctive bill points downward in contrast to the horizontal of the Whimbrel and Willet. The long axis of

its body is tilted obliquely downward from the vertical neck; that of the other two birds is much closer to the horizontal. Its semi-erect posture when walking results in a cranelike stalk rather than the steady pace of the other two species. Its only cry was a rather deep and harsh "kraack," with a nasal quality, only moderately arresting.]

***Totanus flavipes* (Gmelin)**

LESSER YELLOWLEGS

RANGE: Breeds in northern North America; winters from southern United States to Chile and Argentina.

The migrant Lesser Yellowlegs is present from September well into April. It occurs on both slopes, primarily in the tropical belt but also over the central plateau region. It has not been recorded from the northern two-thirds of the Pacific northwest or from the far southwest, both of which it probably visits. It is rather uncommon, being widely but sparsely dispersed, and nearly if not entirely absent from forested regions.

Only in the Guanacaste lagoon country at the head of the Gulf of Nicoya and in the not dissimilar Río Frío region did I happen to see several individuals together. In both places they were stationed at water-filled dips in process of drying and exposing cracked, caked mud at the margins. Elsewhere it is seen sometimes in wet meadows and in open, marshy situations. In flight it regularly gives its one-, two-, or several-syllable call and alights with wings upraised a moment or two. As with the two following species, this long-legged bird habitually nods and teeters. It wades actively when feeding.

***Totanus melanoleucus* (Gmelin)**

GREATER YELLOWLEGS

RANGE: Breeds in northern North America; winters from southern United States to Strait of Magellan.

The Greater Yellowlegs is less common than the Lesser Yellowlegs, which is an uncommon migrant. Carriker (1910, p. 419) called it "a rare winter visitant on the western side of the plateau region and the Pacific coast." I have little to add. I found it not uncommon during the dry season in lowland Guanacaste, but I do not recall ever meeting it on the Caribbean slope other than at the

same sites in the Río Frío region as the Lesser Yellowlegs. Both species call freely during their graceful, ternlike flight.

***Tringa solitaria* Wilson**

SOLITARY SANDPIPER

RANGE: Breeds in northern North America; winters from southern United States to southern South America.

***Tringa solitaria solitaria* Wilson**

RANGE: Breeds in northern United States and southern Canada east of Rocky Mountains; winters from southern United States to southern South America.

***Tringa solitaria cinnamomea* (Brewster)**

RANGE: Breeds in northwestern North America; winters chiefly in southern South America.

Arriving in September and remaining until May, the migrant Solitary Sandpiper occurs over much of the country, from the lowlands of both coasts up the subtropical foothills and across the central plateau region. It is an uncommon visitant encountered only occasionally, more often in the lowlands than elsewhere. The species is indeed of solitary nature, though sometimes two or at most three individuals frequent a favored locality. It is absent from the seashore and open situations, preferring the margins of sluggish streams, lagoons, and quiet pools shielded by trees within openings or alongside woodland. Migrating individuals may mingle with other shore birds that pass through the interior but do not form flocks of their own.

This sandpiper commonly patrols the edges of shallow water and often wades belly deep, when the nodding or pumping of its head and neck may give the mistaken impression that the bird is swimming. In contrast to the busy activity of, say, a wading yellowlegs, the Solitary wades slowly and carefully, with circumspection or suspicion. Or, it may remain motionless except for its nodding head. The ceaseless, apparently involuntary head nodding synchronized with a teetering of the tail characterizes many shore birds, particularly the long-legged ones. This species nods its head in a single up-and-down movement, which it repeats after a variable

pause, perhaps depending on the degree of excitement. The motion of its teetering tail, first down and then up, is the reverse of that of the Spotted Sandpiper, which dips its entire hindquarters independently of the weak head movements.

The time to hear the call of the Solitary is when the bird is startled into flight. The sharp one-, two-, or three-syllable cry is quite different from that of either yellowlegs. Its flight is rapid, erratic, and light as that of a swallow, while its long, narrow, pointed wings and deep wing beats suggest a dark-backed tern. Landing in spectacular, zigzag swoops, it often keeps the wings raised above its back a moment or two.

***Actitis macularia* (Linnaeus)**

SPOTTED SANDPIPER

RANGE: Breeds in North America; winters from southern United States to southern South America.

The migratory Spotted Sandpiper is apt to appear plentifully almost anywhere, from the ocean shores to the central plateau or even higher. In winter it is found along open beaches, on mud flats, in mangroves, and at streams throughout the interior, particularly those with boulders and rocky or gravelly margins. It is especially abundant in migration not only at the seashore and coastal lagoons but inland at streams, pools, meadows, and forest edges. Along the coasts migratory groups may exhibit flock behavior; in the interior, the bird is usually seen singly and appears to be as solitary as the Solitary Sandpiper. The species is largely absent from May to August, but even then an occasional individual can be seen along the coasts. In the absence of other small shore birds, the behavior of the Spotted tends to approach that of *Erolia* and *Ereunetes*.

In Costa Rica the plain winter plumage is the common one, though some fall individuals show a few black spots; by May many are heavily spotted below. The most conspicuous field feature of the bird is the almost continual waterthrush-like teetering of its hindquarters. Walking, often for moments on end between teeters, it holds the bill nearly horizontal; to pick up objects the bird generally kneels forward. The flight of this sandpiper is distinctive as it stiffly moves

its slightly bowed wings in a series of shallow quivering flutters.

In May and especially October I occasionally noted a bird assume an aggressive attitude, similar to that of the Old World Ruff, with head lowered, bill horizontal to and just above the ground, hindquarters raised high, and cocked rounded tail half-spread fanwise, displaying its attractively barred and graduated white tips. Viewed from behind, the tips radiate from the spear-shaped white crissum that covers most of the under side of the tail. Thus postured the bird steps stiffly, almost strutting, toward another individual, which reacts by drawing itself erect and half opening its wings. The two birds then engage, it would seem, in mock combat, yet perhaps with serious intent, as the plucking of a few feathers from the head and neck appears to pass the bounds of sham. Sparring and pecking, they may flutter above the ground. During a pause the second bird may advance with head held high, dragging its tail and the tips of its half-bent wings along the sand; or it may copy the head-down, tail-up stance of the first bird. Either may kneel so as to rest its body on the base of the neck. The two "antagonists" seem to prefer a particular spot to which they return after short chases. Nearby individuals attempt neither to interfere with nor to join the exercise.

***Catoptrophorus semipalmatus* (Gmelin)**

WILLET

RANGE: Breeds along Atlantic and Gulf coasts of North America, in West Indies, and in western United States; winters from southern United States and West Indies to Chile and Brazil.

***Catoptrophorus semipalmatus semipalmatus*
(Gmelin)**

RANGE: Breeds along Atlantic and Gulf coasts of North America and in West Indies; winters from coasts of Gulf of Mexico and West Indies to Venezuela and northern Brazil.

***Catoptrophorus semipalmatus inornatus*
(Brewster)**

RANGE: Breeds in western and central North America; winters from California and

Texas to Galapagos Islands, Chile, and Colombia.

The Willet is a common spring and fall migrant and a not uncommon visitant along both coasts. Rarely, an individual straggles inland as far as the central plateau. Both races occur on the Pacific slope. Birds on the Caribbean side, for which there seem to be only my own sight records, have not been identified subspecifically. Winter-plumaged birds are the ones usually seen in Costa Rica.

Compared with the Whimbrel, it is more often seen singly, occasionally in parties much smaller than the concentrations of the curlew. Its everyday habits seem to differ little from those of the curlew, and the two species often form an intermingled flock. Lone individuals of either can be met along stretches of open beach; small groups, at river mouths. The two are similar in gait, in their limited nodding, and apparently in temperament. The curlew holds its bill level; the Willet, pointed downward at about a 30-degree angle. The Willet flies more gracefully, with measured beats stronger on the downstroke. On alighting it shows a strong tendency to keep its brightly designed wings raised a moment or two.

This is a rather noisy bird, and its varied cries are neither musical nor pleasant. One is a rasping "teetétit" or "wíllaret," tern-like or vaguely like a laugh. Another is an unclear whistle of two notes of equal length, the first higher than the second, something like "will·urr." Others are a gull-like nasal "keek" or "keek" and a curlew-like "kukukuku."

***Aphriza virgata* (Gmelin)**

SURFBIRD

RANGE: Breeds in Alaska; winters south on Pacific coast to Chile.

The Surfbird, a species of the Pacific coast of the Americas, is probably a regular transient though not previously reported in Costa Rica. During the first week of September, 1953, I observed groups of these birds, probably the same ones on different days, immediately south of the entrance to Boca de Barranca (near Puntarenas). They were frequenting the rocks a few yards offshore at the end of the beach. Again, in the latter part

of September, 1954, I saw a group on a tidal flat at the mouth of the Río Parrita (about halfway down the Pacific coast). The birds, picking at the rocks for food, were continually being splashed by the surf. Those on the tidal flat were relatively inactive. Almost half as large again as a Sanderling, the Surfbird is a short-legged shore bird with a pigeon-like look to the head and bill, and it walks in pigeon-like manner. The birds that I watched often hopped on one leg. The only sound given was a rather drawn-out "chrurp," something like a traffic whistle.]

***Arenaria interpres* (Linnaeus)**

RUDDY TURNSTONE

RANGE: Breeds in Holarctic Region; in New World winters south into South America.

***Arenaria interpres morinella* (Linnaeus)**

RANGE: Breeds in northern North America; winters from southern United States through West Indies to Galapagos Islands, Chile, and southern Brazil.

The migrant Ruddy Turnstone occurs on both coasts, almost exclusively along the marine shores. It is by no means common in the spring and fall, when irregularly encountered; at most I have seen four birds together. In the winter it is rarely met, singly or as a well-separated brace, as a rule only at places where other shore birds congregate. Many are in summer plumage by the first week of May, but it is the winter-plumaged bird, sometimes with a trace of breeding dress, that one usually sees in Costa Rica.

Its short legs and withdrawn neck give it a hunched, crouched look, and its head seems rather too small for the body. Its body is held horizontally and is relatively longer and lower than that of most shore birds. Its bill, too, is held on a level plane. The bird has a chesty appearance, to which its breast patch probably contributes, as though the center of gravity were in the front part of the body and dragging it down.

Oblivious of its neighbors, the Ruddy Turnstone goes about its business with a peculiar flat-footed, almost pussyfooting, steady walk. It may patrol the bare or gravelly beach, fractured banks of coral or limestone, or, like a Spotted Sandpiper, it

may mount driftwood which it investigates carefully for food. Usually it prefers the parched upper beach, littered with broken shells, small stones, decaying plants, and pieces of wood. The bird potters about patiently, probing and turning trash and continually jerking aside fragments with its sharp bill. Curiously, the flicked objects, whether a broken shell, a dead leaf, or a smooth seed, almost always land upside down, and the bird never bothers with them further. I have also seen it wading belly deep at the margin of a lakelike river mouth impounded by a sand bank.

The bird is not heard often on the Costa Rican beaches. Its notes include a quick soft "kyewkyewk," a tapering "kyeww," a sharp rough "rekrek," and a weak "weewee" like a wing whistling. Birds frightened into flight sometimes make a little cackle.

***Limnodromus griseus* (Gmelin)**

SHORT-BILLED DOWITCHER

RANGE: Breeds in northern North America; winters from southern United States to Peru and Brazil.

***Limnodromus griseus griseus* (Gmelin)**

RANGE: Breeds in northeastern North America; winters chiefly in eastern Caribbean region, also coast of Brazil.

***Limnodromus griseus hendersoni* Rowan**

RANGE: Breeds in western Canada; winters south probably to northern and northwestern coasts of South America.

[*Limnodromus griseus caurinus* Pitelka

RANGE: Breeds in Alaska; winters along Pacific coast probably to Colombia and Peru; not recorded in Costa Rica.]

The Short-billed Dowitcher is uncommon both in migration and in the winter. The species is known only from the Pacific coast, though it probably visits the Caribbean side too. Apparently it frequents only the seashore and is not found inland with the congeneric *scolopaceus*. It is met singly, as a rule, either alone or with other shore birds, usually along the beach rather than at river mouths, where shore birds assemble in greatest number and variety. I seldom saw it feed

and then only on the lower beach, when it was probing the damp sand deeply, with its beak held vertically. It has a wild, snipelike flight that can be as erratic as that of a nighthawk, featuring an accent on the downstroke of the deep beats. In flight it often utters its one- to three-note, yellowlegs-like cry. It also makes a parrot-like "chirlink."

***Limnodromus scolopaceus* (Say)**

LONG-BILLED DOWITCHER

RANGE: Breeds in northeastern Siberia and northwestern North America; winters from western and southern United States to Colombia, recorded in Argentina.

There seems to be but one previous Costa Rican record of the Long-billed Dowitcher, that of a bird taken at Alajuela on the central plateau. I collected it in January at Catalina in the Guanacaste lowlands at the head of the Gulf of Nicoya; several individuals were present. Catalina is a large cattle ranch with a variety of habitats, including lagoons and flooded fields, grassy "plains," and relatively dry woodland. The dowitchers were feeding at the margins of the "ponds" or flooded dips that then were evaporating rapidly in the dry season. These depressions, which are scattered about on solid ground in open country amid the marshes and lagoons, were being frequented by the present species as well as by both kinds of yellowlegs, stilts, and Least Sandpipers. Information on the two wintering dowitchers is scanty, but there appears to be a marked habitat separation, the Short-billed keeping to the seashore, the Long-billed to mud-bottomed accumulations of fresh water. Neither is reported from the Caribbean slope of Costa Rica, but the Long-billed has been taken in Bocas del Toro Province, Panama.

***Gallinago gallinago* (Linnaeus)**

COMMON SNIFE

RANGE: Breeds in Northern Hemisphere; in New World winters to South America.

***Gallinago gallinago delicata* (Ord)**

RANGE: Breeds in North America; winters to Colombia and southern Brazil.

The Common Snipe, a migrant, has been known from the region of the central plateau, the Guanacaste Cordillera, and the Carib-

bean lowlands. I found it also just below timber line on Turrialba Volcano and in the lagoon country of lowland Guanacaste, while L. R. Holdridge observed it at the Inter-American Institute of Agricultural Sciences (near Turrialba, altitude 2000 feet). Also it is well known to hunters following the Pan-American highway along the northern portion of the high Talamanca Cordillera. The species continues unreported from the southwestern and southeastern sectors of the country, in both of which it probably occurs. In short, it is apt to find its way over most of Costa Rica, yet in most places is normally seen seldom if at all.

Evidently the presence of suitable habitat (marshes, wet meadows, partly flooded fields) accounts for the occurrence of the bird, irrespective of the life zone. I met it more or less regularly only in the still inundated lowlands (December–February) at the head of the Gulf of Nicoya and again at Hacienda Miravalles (altitude 1500–2000 feet) beside the northwestern divide. The bird is no longer a regular visitor to the central plateau, whence it has been reported a number of times in the past, with the year-by-year elimination of its preferred habitat. On the lower Caribbean slope, where it has been recorded from only three localities, I suspect it makes an appearance as a seasonal vertical influx of individuals from the Cordillera Central during the very rainy, chilly months of November and December. The habitat and day-to-day habits of the wintering bird in Costa Rica seem no different from those of the summering bird in the north.

***Calidris canutus* (Linnaeus)**

RED KNOT

RANGE: Breeds in the Holarctic Region; in New World winters from the United States to Cape Horn.

***Calidris canutus rufa* (Wilson)**

RANGE: Breeds in northern North America; winters southward from the United States, chiefly in southern South America.

The transient knot is very uncommon in the fall and still not recorded in the spring. I have seen it only in the latter part of September and early October on the Pacific coast. The single previous record was dated in the

first week of October, also on the Pacific coast. Searching with time and patience I was usually able to find a bird or two or even a small band. All the individuals that I met were in winter plumage.

This is a chunky, short-necked, rather long-legged shore bird of which the "knees" appear knobby at close range. It is not restless, as are the smaller sandpipers, but is relatively inactive like the larger ones. Often it can be approached closely, especially when other birds near it are not frightened into flight. It seems not to walk so well as most other shore birds as it progresses slowly with flat-footed short steps, as if its soles were sore. It hardly strays beyond a few yards from the edge of the water. Though attracted to other species, it does not intimately lose itself among them on the ground, at least in Costa Rica where it is so uncommon, but it is apt to join an alien flock in the air. Even when disturbed or frightened, it seldom makes a sound. I heard it utter only an almost inaudible "wew."

***Crocethia alba* (Pallas)**

SANDERLING

RANGE: Breeds in Holarctic Region; in New World winters to southern South America.

The Sanderling, one of the most common sandpipers along both coasts during migration, seems to have been recorded only once for Costa Rica in the literature. In the winter its numbers are much smaller, but it is met more or less regularly. Unlike many other shore birds, it apparently never leaves the shore for the interior, and it can be expected along stretches of beach almost as certainly as at river mouths. It occurs singly or in parties, sometimes approaching flocks in size, and it mingles indiscriminately with other kinds of shore birds. In Costa Rica I have seen only winter-plumaged individuals, which appear whiter afoot than any other sandpiper and chunkier than any "peep." Its flight is smooth, despite the irregular interpolation of faint flutters between the whipping beats.

Other than at extreme low tide, the Sanderling usually keeps to the edge of the water. No other shore bird in the country so persistently follows the tide in and out, just outside the retreating or advancing foam. The scam-

pering individuals, like erratic toys, hasten about the sand to glean tidbits before the next wave chases them back. The bird appears to be hunched and neckless, and its rather short and sturdy blunt bill, projecting downward at a 45-degree angle (afoot and in flight) has a snoutlike aspect. When feeding, the scrambling bird may hold its bill vertically, with its tip to the sand. Head downward, rooting and snuffling frantically, so to speak, the Sanderling exhibits a hectic piglike gluttony, as though it could never get enough to eat. It even dabbles with its head under water, breathing somehow. At times it aggressively lowers its head at neighboring birds while hunching and ruffling its back. It forsakes its crisscrossing walk for flight only if threatened by an unexpected wave or by the observer.

Its note, often recognizable on the beach, is a sharp, almost clicking "tsick" or "tswick," varying at times to "tsit," "kip," "chit," and "tlick," given singly or several times in succession. The short "i" and the abrupt consonant give it a somewhat special character. Sometimes birds that seem to be quarreling make a chickering gabble.

***Ereunetes pusillus* (Linnaeus)**

SEMIPALMATED SANDPIPER

RANGE: Breeds in northern North America; winters from southern United States to southern South America, also in West Indies.

The Semipalmated Sandpiper is uncommon in migration in the spring and fall and rare in the winter. It occurs occasionally on Pacific beaches and tidal flats, but, in my experience, it is far more apt to be seen on the Caribbean coast. It has even been recorded from the central highlands (in September). As with a number of other shore birds and water birds generally, individuals may linger through the summer (Carriker, 1910, p. 421).

The two species of *Ereunetes* appear virtually identical in life. If well observed, however, I believe it possible to identify many individuals. The field marks are fairly reliable, that is, positive for the Western, negative for the Semipalmated. The Western has an overly lengthened bill, obviously longer than the head, drooping slightly at the tip; that of the Semipalmated is as short as or shorter than the head, sturdier, and more pleasingly proportioned. At any season the Western

usually has its back tinged rufous; the Semipalmated lacks the rufous (although it may appear brownish). In winter plumage, the usual one in Costa Rica, the Western appears to be grayish brown, with a rusty wash down the middle of the back; the Semipalmated appears grayish on its back, rather like the Sanderling. The Western has its wing outlined with sooty blackish which gently but quickly merges with the color of the rest of the wing; the Semipalmated lacks this elegant little touch.

Ereunetes mauri Cabanis

WESTERN SANDPIPER

RANGE: Breeds in Alaska; winters from United States to Peru and Venezuela, also in West Indies.

The Western Sandpiper, in contrast to the Semipalmated, is one of the most common migrant shore birds, found in flocks in the spring and fall and met not uncommonly in the winter. It seems to occur mostly on the Pacific coast, where it may arrive as early as the second week of August.

A flock alights abruptly or scouts around before deciding on a suitable site. Favored localities include river mouths and coastal inlets where tidal action is reduced to a gentle lapping. The landing birds proceed immediately to the business of feeding. Their disproportionately long bills are already pointed downward like the proboscis of a mosquito, as the birds, figuratively speaking, already have napkins tucked around their necks. With single-minded intent, like the Sanderling, the birds scramble about jerkily, probing here, there, as though driven by starvation or a sputtering dynamo. The gait is closer to a flat-footed, weakly prancing goose step than the hurried walk of many little shore birds; the head bobs when the pace is slow, not when speeded up. The birds act as though rushed for time in which to sample the tiny creatures left in the wash between successive wavelets.

Its usual weakly whistled thin note is similar to that of many other shore birds, yet differs from that of the congeneric Semipalmated. It is not loud; often it can be heard clearly only at close range. The following are approximations: "dzeep," "tseep," "dzpeet," "zpwheet," "djeeep," or "cheep." The "dzeep"

can also sound wiry or buzzy; in repetition it usually sounds like a clearer "tseep." The bird also utters a burred "sreeick," a squeaky "tseeip," a swallow-like "tchrip," warbler-like "tsit" 's or "tsint" 's, soft "whit" 's, and various squeaky and scratchy notes.

Erolia minutilla (Vieillot)

LEAST SANDPIPER

RANGE: Breeds in northern North America; winters from southern United States to southern South America, also in West Indies.

The sparrow-sized Least Sandpiper in migration occurs commonly in small bands along both coasts, usually singly and uncommonly inland to the altitude of the central plateau. In the winter it is seen seldom but may be present on the beaches or behind them on mud flats and in open, wet places in the interior. Probably more wintering birds occur in lowland Guanacaste at the head of the Gulf of Nicoya, perhaps also in the Río Frío region, than any place else. It seems to be far more frequent on the Pacific slope than the Caribbean.

As with "peeps" in general, it is usually not shy. It may be even more tolerant of close observation as, if not hard pressed, it will walk ahead of the observer for good distances. Little, hunched, with a somewhat jerky, jarring, rapid stepping, it has a mousy look. Its most commonly given note happens to be the only recognizable one. Weakly trilled, it sounds like a feeble traffic whistle. Other notes, usually one-syllable weak ones, are cricket-like, scratchy, or unclear.

Erolia fuscicollis (Vieillot)

WHITE-RUMPED SANDPIPER

RANGE: Breeds in northern North America; winters in southern South America.

There seem to be only two Costa Rican specimens (C.N.H.M. Nos. 127057, 158196), both males, collected May 14, 1930, by Austin Smith in the lower Térraba Valley near the Pacific coast. Despite intensive searching I did not find this species.

Erolia bairdii (Coues)

BAIRD'S SANDPIPER

RANGE: Breeds in northern North America and northeastern Siberia; winters in southern South America.

Baird's Sandpiper is a regular but uncommon transient; it has not been recorded in the winter. As the species migrates through Mexico and Central America and is not known from the West Indies, it is an unexplained fact that so few birds have been reported from Costa Rica. The old records apply almost entirely to the central plateau region. Cherrie remarked (1895a): "Two specimens of Baird's Sandpiper were taken and a number of others seen June 8 on the Volcano of Irazú, above Tierra Blanca, at about 1500 meters altitude. . . . The genital organs indicated approaching activity."

I met the species in April and early May and September–October, only along the Pacific coast. There a patient search over a period of days usually resulted in the finding of a single bird or perhaps a "pair" or a small party of three or four individuals. The species probably migrates along the Caribbean coast too. Beaches and especially tidal flats at river mouths, the latter the preferred gathering places for many shore birds, should be carefully examined by the observer. Baird's, neither "mousy" like the Least nor "piggy" like the Western, will be recognized as more pleasingly proportioned, interestingly patterned, and warmly colored than the other, regularly seen small sandpipers. For the most part, it seems to be quite silent. Occasionally it utters a rather soft, vibratory "chirri."

***Erolia melanotos* (Vieillot)**

PECTORAL SANDPIPER

RANGE: Breeds in northern North America and eastern Siberia; winters in southern South America.

The Pectoral Sandpiper is migratory through Costa Rica, there being no midwinter records. It can be seen in fair numbers in the spring (April–May) and fall (September–November), when it is apt to occur from the lowlands on either slope to well up the central highlands. It frequents ditches and canals, ponds and lagoons, wet meadows, and even straggles into well-wooded areas; it is largely absent from the beaches.

I have seen it almost always singly in the fall and early spring. As the spring advances the apparently widely dispersed birds form small parties, which in turn band into larger groups, and flock behavior replaces the

former individualism. Large flocks appear to be composed of smaller ones that tend to keep more or less apart on the ground and take to the air independently when flushed. Having risen into flight, however, they form a tight mass all the members of which zigzag simultaneously to flash their white under sides first in one direction and then in another.

This sandpiper is capable of coming to the ground in a dead stop, sometimes followed by a step or two, or it may land in one or two bounces; it may even alight crouched. If disturbed it either shows signs of nervousness or, more commonly, hugs the ground, permitting a close approach before flying. It does not exhibit the exaggerated nodding of many shore birds nor does it teeter noticeably except for an occasional twitch of its tail. Rather than wading it prefers to forage along flooded margins or in wet grass. Its swallow-like notes, something like "tchrip," "tchrip," or "tsrip," are dull and unmusical.

***Tryngites subruficollis* (Vieillot)**

BUFF-BREASTED SANDPIPER

RANGE: Breeds in northern North America; winters in southern South America.

The Buff-breasted Sandpiper has been recorded a few times in the past, not less than 50 years ago, only on the central plateau from early September into October. Carriker (1910, p. 422), who apparently did not obtain a specimen, wrote: "Seems not to be a common visitor, stopping only in the highlands and not remaining all winter." Cherrie (1890, p. 332) observed around San José: "They appeared and disappeared with *Bartramia longicauda* and *Tringa maculata* [= *Erolia melanotos*]." I did not meet it and know nothing about its present status. The species undoubtedly continues to stop on the central plateau, probably in small waves, during the fall migration, possibly also in spring. Perhaps with the clearing of the country, occasional individuals will be found spread over a greater number of localities.

FAMILY RECURVIROSTRIDAE

***Himantopus mexicanus* (Müller)**

BLACK-NECKED STILT

RANGE: Breeds from North America locally through Central America to Nicaragua, also

in West Indies and northern South America; winters to southern South America.

The Black-necked Stilt occurs primarily in the northwestern Pacific lowlands, particularly the Tempisque basin, and in the Río Frío region of the northwestern Caribbean lowlands. Nothing seems to be known about its status. The American Ornithologists' Union (1957) does not include Costa Rica in the breeding range, the supposed southern limit of which is in nearby Nicaragua. The Mexican check list (Friedmann, Griscom, and Moore, 1950) has it extending from the United States to Brazil and Peru. In Costa Rica the species is known neither to breed nor not to breed. The few records date mostly from the winter months, none in the summer.

Personally, I have met it in small flocks in the Guanacaste lowlands in winter; one I collected in January had its ovary measuring 12 by 6 mm. In early April I found it abundant, in groups of several to at least 50 individuals, on the Caño Negro, a lowland tributary of the Río Frío, where Richmond (1893, p. 526) noted a small flock at the end of February. In addition, I saw a lone bird, almost surely a migrant or wanderer, early in May at a lagoon a few miles from the Caribbean coast (Manila, on the Río Pacuare). Most birds that I saw were wading in evaporating, muddy depressions or shallow channels, nearly free of aquatic vegetation, in open country. The noisy and excitable stilts were the sentinels for the assemblage of herons, shore birds, and other aquatic species. When in groups, the stilts stood in the water at wading depth, all facing the same direction. The note is a short nasal squeak or bark, "pr-ep" or "prowp," and with the quality of a gallinule (*Porphyryula martinica*), often uttered repetitively by a number of birds. A sort of "chek" is given too.

FAMILY PHALAROPODIDAE

Lobipes lobatus (Linnaeus)

NORTHERN PHALAROPE

RANGE: Breeds in Northern Hemisphere; in New World winters chiefly at sea to southern South America.

Carriker (1910, pp. 423-424) wrote: "The presence of the Northern Phalarope in the list of Costa Rican birds rests wholly on the record in the 'Biologia,' as having been taken

by Underwood at Desamparados. It is a bird which cannot possibly be mistaken for any other species, hence there can be no doubt as to the validity of the record." This winter-plumaged specimen (M.N.C.R. No. 8913) was collected October 22, 1892, at San Francisco de Desamparados near San José. It remains the only Costa Rican record.

FAMILY BURHINIDAE

Burhinus bistriatus (Wagler)

AMERICAN THICK-KNEE

RANGE: Southern Mexico to Costa Rica, northern South America, and Hispaniola.

Burhinus bistriatus bistriatus (Wagler)

RANGE: Southern Mexico to Costa Rica.

The thick-knee is confined to the Tropical Dry Forest, mostly northward from the head of the Gulf of Nicoya, to the upper limits of the life zone along the slopes of the Guanacaste Cordillera. Also, Mr. E. F. Rivinus informs me that he saw and handled a bird shot March 10, 1962, at Turrúcares on the western approach to the central plateau. A supposed record from San José, perpetuated in the literature, is a misinterpretation of Frantz (1869, p. 378), who reported, instead, that he saw captive birds in chicken yards.

The "alcaraván," an indicator species of the scrubby Guanacaste cattle country, frequents openings in bushy and thickety growth amid low woodland as well as open ranges and coastal grassy "plains" akin to salt marshes. A terrestrial bird, occurring singly or in small groups, it is both diurnal and nocturnal. It has a springy running walk of several steps, ending in a postured halt, and it crouches to the ground at the threat of danger. If closely pressed, it takes to easy low flight for a hundred yards or more. Should the landing spot be marked, a man on horseback can approach fairly close.

This strong-billed, plover-like or bustard-like large bird exhibits an occasional nodding, as does a shore bird, and an occasional lowering and raising of its tail. As noted by Dickey and van Rossem (1938, p. 181), "the iris of this bird has remarkable contractile powers" in accordance with the intensity of light. The eye in daytime has the shape of a somewhat flattened semicircle, its upper half cut off, as it were, by the "brow." Calling

mostly at night it makes a long-continued reedy "prrríp prrríp prrríp pip pip pip pipipipipip" that accelerates before it terminates. Incidentally, this is one of the toughest-hided birds that I ever skinned.

FAMILY STERCORARIIDAE

[*Catharacta skua* Brünnich

SKUA

RANGE: Arctic, Antarctic, and Subantarctic, ranging widely toward tropics.

I caught sight of a Skua in flight when arriving by sea at Puerto Limón in mid-August, 1953. Under similar but far more satisfactory circumstances I again observed the species April 13, 1961. This time I watched four birds from the ship as it lay at anchor in the harbor. They were afloat, sitting on buoys, or flying about, either alone or in combinations of two, three, or four. All were brownish, and no two were alike. One was essentially brown all over; another, brown with pale mottling; the third, brown-capped with a dirty buff-whitish collar, like an immature jaeger; and the last had whitish underparts in contrast to the buff or brownish of the others. All had different wing patterns, though three of the four agreed in having whitish patches on the upper sides of the wings and a whitish rump, in the style of a flying caracara (*Polyborus plancus*). One bird had a diagonal row of tear-shaped whitish streaks on the wings; another, a white patch near the end of the wing both above and below, as in a nighthawk; the others, two patches on the upper side of each wing. The hawklike flight was rapidly driven by deep steady strokes. I do not know which form was represented, but, from the above dates, the birds were probably Southern-Hemisphere migrants. Besides, northern skuas apparently do not winter so far south, whereas southern skuas have been found even farther northward (Murphy, 1936, p. 1007).]

Stercorarius pomarinus (Temminck)

POMARINE JAEGER

RANGE: Breeds principally north of Arctic Circle; in New World, winters principally at sea to southern South America.

Jaegers are rare in Costa Rican waters. The Pomarine is the only species recorded. It is represented by two subadults (A.M.N.H.

Nos. 325750, 325751), a female and male, respectively, both taken by the Eastern Pacific Zaca Expedition of the New York Zoological Society on February 8, 1938, on the Pacific Ocean 20 miles south of Cabo Blanco. I thank Mr. John Bull for bringing them to my attention.

On March 27, 1962, I saw my only Costa Rican jaeger, which I identified uncertainly as this species, flying close to the surface and heading into the pocket-like Bahía del Rincón at the north end of the shark-infested Golfo Dulce.

It might be worth mentioning that, in crossing the Caribbean Sea from the Windward Passage to Costa Rica in early April, 1961, I saw Pomarine Jaegers throughout the day and Parasitic Jaegers occasionally up to a day's distance from Puerto Limón, when they stopped following the ship.

FAMILY LARIDAE

Larus atricilla Linnaeus

LAUGHING GULL

RANGE: Breeds along coasts of eastern North America, southern United States, West Indies, Yucatan, Venezuela, southeastern California, and northwestern Mexico; winters from North Carolina and Pacific coast of southern Mexico to Peru and Brazil.

The Laughing Gull is generally common along the Caribbean coast and is present the year round at Puerto Limón. On the Pacific side I have seen adults, as well as immatures that I hesitated to identify as this or the following species, in the Guanacaste lagoon country at the head of the Gulf of Nicoya and on the Golfo Dulce at Golfito. Though its Central American status is that of a wintering migrant, individuals remain through the summer. I have no comparative data on seasonal abundance. This and the following species are the only gulls known in Costa Rica.

Larus pipixcan Wagler

FRANKLIN'S GULL

RANGE: Breeds in North America; winters along coast of Texas and Louisiana and Pacific coast from Guatemala to Chile.

Franklin's Gull, a winter visitant, I have seen only along the Pacific coastline, from which it may make a slight penetration of the Guanacaste lagoon country at the head of the

Gulf of Nicoya. That it may occur along the Caribbean coast as well is proved by a specimen taken at Puerto Limón by C. H. Lankester and identified by Ridgway (Carraker, 1910, p. 415).

In the spring (April–May), I have seen flocks of immature-plumaged gulls, either of this or of the preceding species or both, migrating high along the Pacific shore. Having arrived at a river mouth, they mill about, meanwhile rising continuously, before setting off again in a northward direction, as do migrating hawks.

***Chlidonias niger* (Linnaeus)**

BLACK TERN

RANGE: Breeds in Northern Hemisphere; in New World winters from Panama to Chile and Surinam.

***Chlidonias niger surinamensis* (Gmelin)**

RANGE: Breeds in North America; winters from Panama to Chile and Surinam.

The Black Tern is a regular transient in the spring and, much more markedly, in the fall, when it can be met from the end of August to the beginning of November; there is no winter record. Sometimes, in September, it occurs in especially large flocks. It is known as yet only from the Pacific coast, but it probably also occurs on the Caribbean side. Migrating along the beaches at the same time as the endless procession of swallows, it appears swallow-like during an afternoon downpour when hundreds of individuals may mill about confusedly, as do the very large swifts *Streptoprocne zonaris*, for example. The bird utters a raucous or squeaky “kek” or “ep.”

***Gelochelidon nilotica* (Gmelin)**

GULL-BILLED TERN

RANGE: Local in warmer parts of Europe, Asia, Africa, Australia, and America.

***Gelochelidon nilotica aranea* (Wilson)**

RANGE: Breeds along coast of eastern United States and in West Indies; winters from Gulf coast of United States to Panama and Surinam.

[*Gelochelidon nilotica vanrossemi* Bancroft

RANGE: Breeds at Salton Sea, California, and northwestern Mexico; winters south to Ecuador.]

I know of only two Costa Rican specimens. One, taken at the end of September, 1926, by Austin Smith at Puerto Jiménez on the peninsular shore of the Golfo Dulce, is the Caribbean *aranea*. The other, taken by me, also in the latter part of September on the Pacific coast, between the Río Parrita and the Río Palo Seco, is in nondiagnostic plumage, with measurements between those of *aranea* and those of *vanrossemi*. The unrecorded Pacific race, *vanrossemi*, would, of course, be the one expected on the Pacific side. There are no reports from the Caribbean side, where the species undoubtedly occurs.

Though known only from the period of the fall migration, the Gull-billed Tern is almost certainly a regular visitant. At any rate, I encountered it in very small numbers in September of different years during visits to the Pacific beaches. Usually I saw lone birds patrol the length of the beach, flying with leisurely beats, not directing the beak downward as do terns that dive, and occasionally swooping for a stranded minnow. I did not see it hunt offshore. Once I noted several individuals together at an exposed flat on which, ternlike, they all stood facing in the same direction.

***Sterna hirundo* Linnaeus**

COMMON TERN

RANGE: Breeds in Northern Hemisphere; in New World winters south to southern South America; in southern Caribbean Sea the year round.

***Sterna hirundo hirundo* Linnaeus**

RANGE: Breeds in Northern Hemisphere; in New World winters from Baja California to Peru and from South Carolina to Strait of Magellan.

There seems to be only one Costa Rican record, concerning which Mr. C. C. Ludwig (personal letter, December 4, 1956) informed me as follows: “Common Tern carrying band No. 34-362711 was banded by us [F. E. and C. C. Ludwig] on Lone Tree Island in Lake Huron on July 7, 1935. Same was reported killed on April 19, 1941, at Barranca [on the Pacific coast], Costa Rica. Information came from Señor Emilio Acosta and was reported by the American Consul through the State Department. In addition to this one reported

from Costa Rica we have had common Terns reported from Honduras, Nicaragua, Panama, also from Ecuador and Peru, South America. All of these birds were banded as immatures unable to fly." Concerning the same record, Dr. O. L. Austin, Sr. (personal letter, November 22, 1956), wrote me that "in view of the many recoveries in Texas and other parts of Central America I believe the species either passes thru Costa Rica in migration or even some winter there." Future observations along the Costa Rican beaches will perhaps prove Austin correct. At any rate, I never saw a Common Tern or anything resembling one.

[*Sterna anaethetus* Scopoli

BRIDLED TERN

RANGE: Pantropical seas.

A Costa Rican record of the Bridled Tern was accepted by Ridgway [1919 (1901-1950), pt. 8, p. 513, footnote], probably on the unsatisfactory basis of a mere listing by Zeledón (1882, p. 36; 1887, p. 133). The species is, of course, to be expected in Costa Rican waters. I have a single sight observation made in mid-August, 1953, in the harbor of Puerto Limón. I assume that this bird belonged to the Caribbean race, *recognita*; probably the Pacific race, *nelsoni*, occurs occasionally along the west coast. In the open Caribbean Sea I have heard this species give voice to a scratchy "meeahr," the sort of cry one associates with an angry cat.]

[*Sterna fuscata* Linnaeus

SOOTY TERN

RANGE: Pantropical seas.

The Sooty Tern, as is the preceding species, is represented by an Atlantic and a Pacific form, neither of which has been substantiated by a Costa Rican specimen. In mid-August, 1953, I saw Sooty Terns off the Caribbean coast while approaching Puerto Limón by ship from the north. These birds almost surely belonged to the Atlantic race, nominate *fuscata*. The only note I heard was a squeaky, ratchety "äääck." The Pacific race, *crissalis*, perhaps occurs along the west coast, at least casually.]

[*Sterna albifrons* Pallas

LEAST TERN

RANGE: Warmer parts of North America,

Europe, Asia, Africa, Australia, and north-eastern South America; in New World winters to Peru and Brazil.

I observed this species at close range September 21 and 23, 1954, on the Pacific coast near the mouth of the Río Palo Seco (between Parrita and Quepos). The several sharply black-billed, winter-plumaged individuals, apparently adults, kept together as a small flock. I also followed about an obviously exhausted bird that took to short flight when closely pressed. Several times during the entire latter part of the month I noted small groups of little terns, probably Least, fishing well offshore. There is no other Costa Rican report.

The birds had the habit of standing on the lower beach and exposed tidal flats, mostly facing the same direction, like alert sentries. Their crossed wings, extending well beyond the relatively short, weakly forked tail, made them appear hollow-backed. Short-legged, with the "knee" almost hidden, they walked smoothly, with flat-footed little steps. Often they held their bills partly opened. Disturbed, they usually took a few steps, with wings raised vertically, before heading straight out to sea. In flight they seemed to be the size of a small plover with a pointed tail. The rowing wings, accented on the downstroke, beat in a bouncing butterfly-like manner. On alighting, the birds kept their wings raised for a moment. Their sounds included a grating metallic "tsrink," a weak rasp like that of a baby bird, and a plover- or cricket-like "tsirrip.]"

Thalasseus maximus (Boddaert)

ROYAL TERN

RANGE: Breeds in southern United States, Mexico, West Indies, west Africa; in New World winters from southern United States to southern South America.

Thalasseus maximus maximus (Boddaert)

RANGE: Breeds along Atlantic and Gulf coasts of United States, both coasts of Mexico, and in the West Indies; winters from California and Gulf coasts to Peru and Argentina.

The status of the Royal Tern seems to be that of a visitant along both coasts from the latter part of August through April. Individ-

uals may also be met throughout the summer. In my experience the species is much more common on the Pacific coast than the Caribbean. Usually it is seen singly or in two's, either in flight above the surf or behind the breakers or standing offshore on an exposed flat. Its beak varies in color between yellow-orange and red. Its tail usually appears incised rather than forked and extends back no farther than the tips of the wings.

FAMILY COLUMBIDAE

Columba fasciata Say

BAND-TAILED PIGEON

RANGE: Western North America to northwestern Argentina.

Columba fasciata crissalis Salvadori

RANGE: Costa Rica and western Panama.

The Band-tailed Pigeon is distributed commonly to abundantly at the higher elevations along all the mountain ranges of the country, where it can usually be seen in flight, often high in the air. It appears to be most plentiful, perhaps because of concentrated numbers, in the montane belt. Where unmolested it may be abundant in the lower montane belt and, locally, downward into the subtropical belt. Small numbers descend probably seasonally to portions of the central plateau from the neighboring slopes. Along the Pacific side of the Guanacaste Cordillera, just above the limits of the tropical belt, I have seen and heard it sweep down the open mountain slopes with the velocity and some of the noise of an express train. Indeed, Austin Smith collected it at an altitude of only 400 feet in northern Guanacaste, close to the continental divide.

This large arboreal pigeon dwelling in mountainous terrain cannot be said really to inhabit forest. Rather, it occurs at the many breaks in unsettled forested country as well as in parklike pastures at middle and upper altitudes. In flocks or small groups, also singly, it usually keeps very high in the trees. Sometimes a group drops, parrot-like, to berry-bearing low trees, and occasionally a bird goes to the ground. Though given to an exaggerated nodding, it often sits inactive, concealed from sight or not. Its call is an owl-like "oo-who" or "who-oo-who," given singly or repeated several times, or a dull

Columba-like "oo, oo, oo, uh-oó," and so on. The adult-sized fledgling makes a pewee-like "peep."

Patagioenas speciosa (Gmelin)

SCALED PIGEON

RANGE: Southern Mexico to Bolivia and northeastern Argentina.

The Scaled Pigeon was known until recently only from the Pacific southwest, apparently confined to the General-Terraba region, from about the middle of the tropical belt upward into parts of the subtropical belt on the approaches to the Talamanca Cordillera. It is mostly absent from the lower Terraba drainage and as yet entirely absent from the neighboring wet-forested Golfo Dulce area. Though present in Bocas del Toro Province, Panama, and southeastern Nicaragua, it had not been reported from the entire Caribbean slope of Costa Rica. To my surprise, I discovered it in the Río Frío region of the northwestern Caribbean lowlands, whence not recorded by Richmond (1893). The bird is common in both of its restricted ranges.

In the southwest I met it as a rule in small flocks that generally kept high in the trees. There it frequents forest borders, patches of forest, thinned woodland, and openings with trees beside woodland; it enters into forest hardly, if at all. In the Río Frío region, where I saw it mostly singly, its habitat and habits are similar. The southwestern population makes a dull, low "oooo oó" or "roo, aroo" (the "r" often guttural), with the first note long, the second short, as well as a somewhat different "oo oó oo." The birds in the Río Frío region give a mournful "oóoo, oo-oo oóoo," similar to the calls of the congeneric *flavirostris* and *cayennensis*.

(See Johnston [1962] for the use of *Patagioenas*.)

Patagioenas flavirostris (Wagler)

RED-BILLED PIGEON

RANGE: Southern Texas to Costa Rica.

Patagioenas flavirostris minima (Carriker)

RANGE: Nicaragua and Costa Rica.

The Red-billed Pigeon reaches its southern limit in central Costa Rica. Apparently it entered the country originally through the dry-

forested northwest, whence it spread to the subtropical slopes of the neighboring continental divide, across the central plateau region, and upward to the lower montane belt in the central highlands (as well as the Dota region), including their Caribbean versant which, however, it has not descended below the subtropical belt. Otherwise it is missing from most of the Caribbean slope, excepting a weak penetration of the Río Frío region, and from all of the southwest. This tongue-like dispersion is similar to that of several members of the arid Pacific avifauna of Mexico and northern Central America and complements in Costa Rica the distribution of the congeneric *cayennensis*. Although common to abundant in many parts of the subhumid northwest down to sea level, it is also common to abundant in the wet-forested periphery of its range, ostensibly as an altitudinal replacement of the tropical-belt *cayennensis*.

In Costa Rica the Red-billed Pigeon (appearing ivory-billed in life) is strictly arboreal in medium-sized to tall trees, which it seldom descends below medium heights. Where common it is seen usually in small flocks, where uncommon, singly, in thinned woodland and patches of woods, at forest borders, in gallery forest, and in country of plantation type. Its mournful call is as a rule a four-note "hoóoo hoo·hoo hooo," sometimes a five-note "woóoo, woo hoohoo hoo," made distinctive by the higher-pitched, lengthened, and questioning introductory note. Otherwise it is very similar to the call of the following species.

***Patagioenas cayennensis* (Bonnaterre)**

PALE-VENTED PIGEON

RANGE: Southern Mexico to Bolivia and northern Argentina.

***Patagioenas cayennensis pallidicrissa* (Chubb)**

RANGE: Southern Mexico to Colombia and Venezuela.

Whereas *flavirostris* seems to have followed the dry Pacific slope southward into northwestern Costa Rica, the present species has probably spread northward from South America through "rain"-forested life zones. Here it is distributed primarily in the humid tropical belt over most of the Caribbean and the southern half of the Pacific slopes. It meets *flavirostris* along the Guanacaste Cor-

dillera (no report from the Cordillera de Tilarán) and in the lowlands at the mainland side of the Gulf of Nicoya, where it and *flavirostris* are, respectively, at their northern and southern limits on the Pacific slope. Also, I found it abundant and *flavirostris* scarce in the Río Frío region. It is extremely uncommon if not rare on the central plateau. In fact, it is mostly absent from the subtropical Caribbean slopes of the central highlands, where *flavirostris* is common.

The species occurs in openings of one sort or another in which there are trees and along woodland borders, generally in partially deforested country. It does not enter forest and is absent from or rare in suitable habitat in extensively forested regions. I found it plentiful, however, in mangroves and common in adjacent, cutover, recently forested areas at the head of the Golfo Dulce. This large arboreal pigeon usually keeps high in the trees and, where common, is social with others of its kind. Whether in groups or alone it is generally shy of the observer. Its mournful call is very much like that of *flavirostris*, but it is usually three-noted, with the first syllable not so distinctive as that of *flavirostris*.

***Oenoenas nigrirostris* (Scater)**

SHORT-BILLED PIGEON

RANGE: Southern Mexico to eastern Panama.

The Short-billed Pigeon, one of the common birds of the country, is widely distributed through the humid life zones on both slopes. It ranges from the lowlands well into the subtropical belt generally and, on the Caribbean versant of the Cordillera Central, to the lower limits of the lower montane belt, but it is much more common at the lower elevations. On the Pacific side it is absent from almost all the Tropical Dry Forest, which it barely reaches from the south to approximately the Río Grande de Tárcoles. It seems to be scarce along the Cordillera de Tilarán and absent from the Guanacaste Cordillera.

Occurring in virgin forest and the adjacent semi-open, it is the only truly forest-inhabiting arboreal pigeon in the "rain"-forested tropical belt. It keeps as a rule from medium heights to high in the trees, except for a rare descent to the ground in open places. In the forest I have seen it almost always singly, but

along the border and in the shaded semi-open it may be present in small groups of loosely associated individuals. It is also seen regularly as a pair, the members of which perch side by side. I observed what may have been courtship activity between two birds, one of which was continually fluttering up, down, about, and to and fro, as though trying to mount the other, which kept shifting sufficiently to allay the ardor of its partner or to delay the denouement.

This relatively inactive pigeon does not fly about very much, and it may sit on a branch for long periods. Often it is not at all shy. It may hang gymnastically like a parrot or a toucan, sometimes upside down on a swinging vine or clinging to a stem, to feed on small fruits and *Cecropia* pods. I have also seen it exploring knotholes on the upper sides of branches, to what end I do not know.

Its call, heard from all sides in so many places, does not sound at all pigeon-like to me. Costa Ricans aptly substitute the words "dos tontos son," the vowels of which the bird pronounces "aw." Its four-note pattern is usually —.—, sometimes —.—. The bird also grinds out an antbird-like "rrrr."

(See Johnston [1962] for the use of *Oenoenas*.)

***Oenoenas subvinacea* (Lawrence)**

RUDDY PIGEON

RANGE: Costa Rica to Bolivia and Mato Grosso.

***Oenoenas subvinacea subvinacea* (Lawrence)**

RANGE: Costa Rica and western Panama.

The Ruddy Pigeon occurs commonly in the central highlands, including the Dota Mountains, and, in undetermined abundance, on the slopes of the Talamanca Cordillera. Though apparently common along the higher parts of the Cordillera de Tilarán, it is not reported from the Guanacaste Cordillera. There are a couple of reports from tropical-belt localities, but I believe these to be inaccurate and referable to nearby mountain slopes. Its vertical distribution extends from about the middle of the subtropical belt, perhaps locally a bit lower, well into the lower montane belt and here and there into the montane belt.

This species is so similar in life to *nigrirostris*

that, unless observed in good light at close range, it can be distinguished only by voice. In death, too, I have found it misidentified as *nigrirostris* in collections. *Nigrirostris*, a Central American species, is most abundant in the humid tropical belt; *subvinacea*, a South American species here at its northern limit, inhabits the cool and wet middle altitudes. It is largely in the lower half or two-thirds of the subtropical belt that the Ruddy and small numbers of *nigrirostris* are sympatric.

A woodland species, it inhabits broken, forested, sparsely inhabited country and generally keeps rather high in the trees; it is seen on the ground rarely. Rowley (1878, p. 76) wrote: "Mr. Boucard states to me that the specimen . . . was killed at an altitude of 7000 feet, on the Volcan de Irazu, among a small flock of ten birds distributed on several trees; usually about two or four individuals rest on each tree. The species keeps to the mountains, and feeds on seeds. When acorns appear, as they do in May, this Pigeon is frequently seen in the oak forest; and, Mr. Boucard adds, here it lives." Its call, a replica of that of *nigrirostris* in quality and number of notes, differs only in pattern: —.—.—. The bird also makes a guttural growling "grrrroo" similar to that of *nigrirostris* and of a number of other pigeons.

***Zenaidura macroura* (Linnaeus)**

MOURNING DOVE

RANGE: North America, locally in Mexico and Central America to Panama; Bahamas and Greater Antilles.

[*Zenaidura macroura carolinensis* (Linnaeus)]

RANGE: Breeds in eastern North America; winters from southeastern United States to Panama, also in Cuba; not recorded from Costa Rica.]

***Zenaidura macroura marginella* (Woodhouse)**

RANGE: Breeds in western North America; winters to Panama; recorded in Colombia.

***Zenaidura macroura turturilla* Wetmore**

RANGE: Costa Rica and western Panama; also Guatemala and Nicaragua (Aldrich and Duvall, 1958, p. 126).

The Mourning Dove in Costa Rica is

represented by a resident and a migrant population. The native *turturilla* is quite uncommon and has been taken only in the central highlands: the upper subtropical-belt slopes that face the central plateau, parts of the central plateau, especially the eastern portion, and the hilly country south of the city of Cartago. It averages larger than the Panamanian birds named by Wetmore (1956, p. 123), and its wing measurements, as determined from breeding specimens, are the same as those of many specimens of the migrant *marginella*. Hence it can be identified only from known breeding individuals in most instances.

The migrant *marginella* is known primarily from the Tropical Dry Forest in which it winters commonly in the open ranch lands and the lowland Guanacaste lagoon country. It rises uncommonly on the neighboring continental divide and the western portion of the central plateau region. I also met it at the beginning of April in the Río Frío region. The bird generally occurs in flocks of varying size and keeps rather low in scrubby trees. The migrant *carolinensis*, recorded from western Panama, undoubtedly occurs in Costa Rica, but I know of no record.

It would appear, in sum, that birds from the northwest are all *marginella*, birds from the plateau region are mostly *turturilla* and perhaps partly *marginella*, while *carolinensis* must occur in transience and probably in winter. The only report of a Mourning Dove on either slope in southern Costa Rica is that from Buenos Aires by Cherrie (1893, p. 53). I have not seen this specimen, which may have been a migrant.

***Zenaida asiatica* (Linnaeus)**

WHITE-WINGED DOVE

RANGE: Southwestern United States to western Panama; Bahamas and Greater Antilles; western Ecuador to northern Chile.

***Zenaida asiatica asiatica* (Linnaeus)**

RANGE: Southern Texas through eastern Mexico to Nicaragua, also in Bahamas and Greater Antilles; northern birds winter southward at least to Costa Rica.

***Zenaida asiatica australis* (Peters)**

RANGE: Pacific slope of northern Costa Rica and western Panama (Coclé Province).

The White-winged Dove in Costa Rica consists of a resident population augmented to unknown extent by visitants from the north. Proof for the presence of the latter has been kindly provided (*in litt.*) by George B. Saunders of the Fish and Wildlife Service of the United States Department of the Interior: "I find that the Texas Fish and Game Commission banded . . . [a] nestling *asiatica* near Jimenez, Tamaulipas, which is slightly more than 200 miles southwest of Brownsville, Texas. It was reported from Nances de Esparta (near Puntarenas), Costa Rica, by letter dated May 10, 1961, but the date of recovery was not mentioned."

In Costa Rica the species is largely confined to the dry-forested Pacific northwest, from northern Guanacaste southward to a little beyond the entrance to the Gulf of Nicoya. It extends inland to the lower slopes of the Guanacaste Cordillera and onto the western approach to the central plateau, where it has even been recorded, abnormally in my opinion, from San José. It is generally seen in small groups of two to several individuals, also flying about singly. The bird is common in patches of open scrubby woodland and thickety growth, usually not above medium heights in medium-sized trees. Its throaty, sometimes hoarse call is normally three- or four-noted (occasionally five-noted) and variably accented. Sometimes it begins with a lengthened note, as does that of the sympatric Red-billed Pigeon, or with a growling "hoo."

***Scardafella inca* (Lesson)**

INCA DOVE

RANGE: Southwestern United States to Costa Rica.

The Inca Dove seems to have been first recorded in 1928, when Austin Smith collected it at La Cruz in northern Guanacaste, near Nicaragua. Possibly that date indicates the approximate time of arrival of the species. At any rate, it is now common over most of the Tropical Dry Forest at least as far south as the Barranca-Puntarenas district (where it is common to abundant). There is no report from the northwestern divide. It inhabits small openings in semi-open and cutover country, regularly beside human habitations. It frequents the lower portions of the trees,

thickety and shrubby growth, and scrubby vegetation generally. It is seen on the ground as a matter of course, its belly almost scraping the surface. Usually several individuals can be found at the same site.

This pale-colored little dove rises from the ground and comes to rest with the lightness of a moth or goatsucker. Alighting suddenly it keeps its long, pointed tail raised a little while before lowering it. Wetmore (1944, p. 40) collected a bird with developing ovaries on October 19. I found it in breeding condition the first part of December. The usual call is a loud and emphatic "cow coo" that may be repeated several times. The bird also makes a dovelike hoarse "caw cu·caw," accompanied by an exaggerated nodding, and a "coo·coo·coo·coo" and so on, not unlike the cackling of a hen.

***Columbigallina passerina* (Linnaeus)**

COMMON GROUND DOVE

RANGE: Southern United States to Costa Rica; Colombia to Ecuador and northern Brazil; West Indies.

***Columbigallina passerina neglecta* (Carriker)**

RANGE: Honduras to Costa Rica.

The North American section of this species reaches its southern limit in northwestern and central Costa Rica, in common with other birds of the relatively arid Pacific slope. Here it is fairly common to very common over most of its range. It is distributed throughout the Tropical Dry Forest, rises to the subtropical belt along the Guanacaste Cordillera, and spreads eastward across the central plateau to its eastern edge and upward to the lower montane belt on the slopes facing the meseta. Richmond (1893, p. 523) found it at San Carlos, Nicaragua, only a few miles from the Río Frío region, where it is perhaps present occasionally in small numbers. The taking of two birds (C.N.H.M. Nos. 44086, 44087) at "Limón" by H. F. Raven in 1910, I consider an almost unimaginable event; possibly the locality was Mata de Limón near Barranca and Puntarenas on the Pacific coast.

This little dove is primarily an inhabitant of the semi-open and spends a good deal of time foraging on the ground. It usually perches on any convenient stopping place, including the roofs of low buildings inside

towns. Its dull call, "oo-oo" (or "awp"), which may be repeated several times, hardly differs from that of the congeneric *talpacoti*.

***Columbigallina minuta* (Linnaeus)**

PLAIN-BREASTED GROUND DOVE

RANGE: Southern Mexico to Bolivia and extreme northeastern Argentina.

***Columbigallina minuta elaeodes* (Todd)**

RANGE: Costa Rica to Colombia.

The species is known primarily from the valley of the Río Térraba and its vicinity in the southwest, where it ranges from the lowlands to the upper limits of the tropical belt. It is not uncommon in the open savannas that stretch from Buenos Aires to Boruca and probably occurs in similar habitat elsewhere in the region. Also on the Pacific slope I met with two considerably smaller, isolated populations far to the northwest in the open, grassy, cattle country at the upper tropical bases of Miravalles and Orosí volcanoes.

At its center of distribution in the southwest this diminutive dove occurs with the congeneric *talpacoti*; in the northwest, with *talpacoti* and *passerina*. The female, incidentally, resembles the larger one of *talpacoti* but, among other differences, it has the under tail coverts scaled or mottled, unlike the evenly colored crissum of *talpacoti*. I have seen the Plain-breasted almost always singly, sometimes in two's, generally with partly cocked tail, walking on the ground, especially where sparsely covered with short grass; it appears very short-legged. Individuals are often found mingling with *talpacoti*.

***Columbigallina talpacoti* (Temminck)**

TALPACOTI DOVE

RANGE: Mexico to Bolivia and northern Argentina.

***Columbigallina talpacoti rufipennis* (Bonaparte)**

RANGE: Southern Mexico to Colombia and Venezuela.

In contrast to the other two members of its genus, the Talpacoti Dove enjoys a country-wide distribution, from the lowlands locally into the lower limits of the subtropical belt. It is common both in the dry-forested Pacific northwest, where *passerina* is wide-

spread, and the humid tropical belt, from which *passerina* is absent, in the rest of the country. It is almost completely replaced by *passerina*, however, over the subtropical central plateau region. Hence, apart from their sympatry in the northwest, the distributions of *talpacoti* and *passerina* are complementary. Notwithstanding the general abundance of the bird, its precise occurrence in a region is rather spotty.

A species of the open and semi-open, it is found at openings in formerly solid-forested regions, as on the lower Caribbean slope and in the Golfo Dulce lowlands. Usually it is seen in groups or scattered individually over an area, hardly ever alone. It forages on the ground in open places, whether a largely treeless extension or a clearing bordered by woodland, and it perches on low vegetation regularly. Its call is a muffled "oo-oó, oo-oó," similar to that of *passerina*. It also makes a somewhat different "oowúh oowúh oowúh" and an iterated "pidiwúp."

Claravis pretiosa (Ferrari-Perez)

BLUE GROUND DOVE

RANGE: Southern Mexico to Bolivia and northern Argentina.

The country-wide distribution of the Blue Ground Dove is virtually identical to that of the preceding species, except that it ranges higher into the subtropical belt, particularly in the Reventazón Valley, on the central plateau, and along the slopes and spurs of the Talamanca Cordillera in the southwest. It is most abundant, however, at the lower elevations. It is found principally in the humid life zones, uncommonly in the dry-forested northwest, with the exception of the general vicinity of the Gulf of Nicoya. Though not an inhabitant of forest, it is present, uncommonly, beside openings in extensively forested regions and plentifully in partially deforested areas.

The species frequents overgrown woodland borders and the periphery of shrubby or thickety second growth, tree plantations and parklike tracts, but not open fields. In wooded country it may occur in some open situations with *talpacoti*, but it also frequents more heavily overgrown sites from which *talpacoti* is absent. In addition, I found it common in mangroves. Though predomi-

nantly a terrestrial forager, it is quite arboreal. Generally it perches low in rather dense second-growth vegetation, occasionally on largely leafless upper branches of a medium-sized tree; rarely, it calls from a stub. Lighting on a branch, it walks a few steps until hidden by a large leaf and, as do *Leptotila* spp., flaps and flutters through leafy branches to better concealment; it usually nods nervously when aware of the observer. It often flies rather low above the ground, yet noticeably higher than the little ground doves (*Columbigallina*) or the larger ones (*Leptotila*). In overgrown habitat it is often seen shooting by, followed by a companion of the opposite sex, to lose itself in shrubbery or thickets.

In most parts of the country it is usually seen singly or in pairs, seldom in groups. Yet I found it regularly in ground-foraging bands containing both sexes in open places at scrub-wooded Boruca in the southwest. There the birds were walking about with a trace of a strut and swelling their necks, acting all in all as members of a hierarchal peck order. The usual call is a single deep "hawp" or "hoop," similar to but abbreviated and recognizably different from that of *Leptotila verreauxi*. The bird also makes a sharper "coot," a low-pitched short hoarse "boor," and guttural or croaking notes.

Claravis mondetoura (Bonaparte)

MONDÉTOUR'S DOVE

RANGE: Southern Mexico to Bolivia and Venezuela.

Claravis mondetoura mondetoura (Bonaparte)

RANGE: Costa Rica to Bolivia and Venezuela.

The montane Mondétour's Dove is known from only two areas in the central part of the country. It has been recorded several times from the Irazú-Turrialba massif (not from Barba and Poás) and the mountainous eastern and southeastern portions of the central plateau in the general vicinity of the city of Cartago. It is also recorded from the northern end of the Talamanca Cordillera and the nearby Dota Mountains. The distribution probably continues along the Talamanca Cordillera to Chiriquí.

Carriker (1910, p. 401) had this to say:

"One of the rarest of the doves, and found only at the higher altitudes in the forest, where it apparently always keeps on, or near, the ground. The specimen taken on the Volcan de Irazú was secured in the dense forest at an elevation of about 8,000 feet. Another was seen on the Volcan de Turrialba . . . in an extremely dense piece of woodland just below timberline." Sassi (1938, p. 314) reported a specimen taken just behind the forest border high on Irazú Volcano. I did not find it.

***Leptotila verreauxi* Bonaparte**

VERREAUX' DOVE

RANGE: Southern Texas to Bolivia and central Argentina.

***Leptotila verreauxi verreauxi* Bonaparte**

RANGE: Southwestern Nicaragua to Colombia and Venezuela.

Verreaux' Dove is essentially a Pacific species common at tropical-belt elevations the length of the country. In the dry-forested northwest it rises to the lower slopes of the continental divide; in the humid southwest, to the subtropical belt in the Dota region and here and there along the slopes and spurs of the Talamanca Cordillera. It crosses the subtropical central plateau in diminishing numbers to the Caribbean side where, in seemingly increasing numbers, it follows the Reventazón drainage downward to approximately 2000 feet. Otherwise it is completely absent from the Caribbean slope. The race *riottei*, described for the Caribbean side of the central plateau by Lawrence (1868-1870, p. 137) and accepted by Ridgway [1916 (1901-1950), pt. 7, p. 450] on the basis of one specimen, I find inseparable from *verreauxi*. On the one hand, the bird ranges continuously across the central plateau. On the other hand, the darkness of the supposed Caribbean form is individual, as dark birds also occur, apparently under humid conditions, in the Térraba-Golfo Dulce region.

The preferred habitats include scrubby waste land, plantations, tangled second growth, and the borders of woodland and streams. The bird barely enters the forest proper, at best a little way along broad trails. It is remarkably abundant in certain localities, as in the General-Térraba region,

where it strolls almost as tamely as a domestic pigeon along roads and enters gardens and patios, sometimes virtually under foot. A confirmed terrestrial forager, it usually perches on low leafy branches and in thickets, sometimes higher to 25 feet up, thus often escaping detection; it may walk along the branch until better concealed by the foliage. In these circumstances a bird reveals its nervousness by an exaggerated nod, in which it first draws its head back, then extends it forward, as if trying to gulp down too big an object, accompanied by a dipping jerk of its tail. Afoot the bird potters about like a mechanical toy. Its head, bobbing with the busy regularity of a sewing machine, and its short legs, compensating by speed of pace what they lack in length of stride, emphasize the rigidity of the stiffly held body and tail.

Verreaux' makes a low-pitched, drawn-out, mournful "hawp" or "hoop," which has been aptly compared to the sound produced by one's blowing into a bottle. It is difficult to trace because of its unusual carrying power and varying volume; sometimes it is preceded by a short low note or two, audible at close range. The bird also makes a growling, low "grr·oorr" while jerking its head and tail.

***Leptotila plumbeiceps* Sclater and Salvin**

GRAY-HEADED DOVE

RANGE: Eastern Mexico to Colombia.

Leptotila plumbeiceps plumbeiceps

Sclater and Salvin

RANGE: Eastern Mexico to Colombia (excluding Coiba Island and Cape Mala Peninsula of western Panama).

The Gray-headed Dove is rare in most of Costa Rica, where it is largely confined to the Pacific slope. It has been known from a few tropical-belt localities widely scattered from the Tempisque Valley and the mainland side of the Gulf of Nicoya in the dry-forested northwest to the wet Golfo Dulce region in the far southwest. Having previously glimpsed this bird at only two sites in the southwest, I was astonished to find it common at Los Chiles on the Río Frío in the northwestern Caribbean lowlands.

This *Leptotila* differs little from the congeneric *verreauxi* and *cassinii* in habitat and terrestrial habits. I have seen it at the

periphery of forest, in the shade of scrubby, thickety woodland or subforest, at marshy grassy places thick with shrubbery, in the semi-open close to woods, and even in short-grassed treeless openings. I met it only singly in the more open situations. In fact, I found the same bird foraging day after day in an open pasture on the bank of the Río Frío, and an occasional individual would shoot low through openings and across the river in the manner of the congeneric *L. cassinii cerviniventris*, which was also present. Again at the Río Frío I met it regularly in sedentary groups of four or five individuals afoot on a broad trail passing through second-growth woods. Disturbed, the birds scattered to perch behind a screen of foliage in the understory. Here at Los Chiles it was co-abundant with *L. cassinii rufinucha*; I did not see *L. verreauxi*. On the Pacific slope, by contrast, it apparently occurs everywhere in the same places as *verreauxi* and to a lesser extent with *cassinii rufinucha*.

***Leptotila cassinii* Lawrence**

CASSIN'S DOVE

RANGE: Southern Mexico to Colombia.

Leptotila cassinii cerviniventris

Sclater and Salvin

RANGE: Southern Mexico to northwestern Panama.

***Leptotila cassinii rufinucha* Sclater and Salvin**

RANGE: Western Costa Rica and southwestern Panama.

The Caribbean *cerviniventris* is distributed the length of the lowlands, excepting the Río Frío region, and up the foothills and slopes of the Cordillera Central and the eastern side of the plateau region to perhaps 4000 feet. Northward from Lake Arenal it spills through humid gaps in the Guanacaste Cordillera to its Pacific-facing slopes at lower-subtropical elevations. It is sympatric with *verreauxi* in coffee fincas and banana plots above 2000 feet on the approaches to the central plateau. Though not recorded from the Talamanca Cordillera, the bird probably rises upon its lower slopes.

The well-marked Pacific race, *rufinucha*, centered numerically in the far southwest,

extends northward in greatly diminished numbers to the shores of the Gulf of Nicoya in the vicinity of Puntarenas, possibly farther; it is otherwise unknown from the Tropical Dry Forest. Vertically, unlike *cerviniventris*, it hardly rises above the tropical belt. To my great surprise I found an apparently isolated population of *rufinucha* in the Río Frío region on the Caribbean side, only a few miles from Nicaragua, where I would have expected *cerviniventris*. In view of Carriker's (1910, p. 403) belief that *cerviniventris* crosses from one slope to the other "along the southern shores of Lake Nicaragua," it might be rewarding to discover the zone of contact and the interrelations of the birds therein. Otherwise, except for "a specimen from Alajuela [on the central plateau] which must have been a straggler" (Carriker, *loc. cit.*), *rufinucha* appears to meet *cerviniventris* nowhere in the country. *Cerviniventris*, incidentally, is largely if not entirely absent from most of the central plateau, especially its Pacific side.

The race *cerviniventris*, though I have found it uncommonly inside forest, is much more a woodland inhabitant than, for example, the congeneric *verreauxi*, which prefers more open surroundings. Inside solid forest it occurs sparingly at openings and breaks with tangled undergrowth and along the edges of forested swamps under broken canopy. Its true habitat, at any rate the one it frequents most abundantly, includes overgrown forest borders, shaded and relatively open woodland, and second growth in wooded areas. By comparison, the race *rufinucha* seems to have a broader ecological tolerance. Thus, in the Golfo Dulce region, I met it regularly on trails and on the leaf-covered floor in forest, but also with *verreauxi* in tangled low growth outside the forest. Both races of Cassin's Dove generally occur terrestrially, alone or perhaps in two's, in the cover provided by thickety growth and shrubbery. Yet at Los Chiles I found *rufinucha* in small groups as a matter of course.

Essentially a "ground" dove, the species either walks away from the observer or, flushed to a low branch, may turn its back and sit a little while absolutely still before nodding its head and lifting its tail nervously. Its mournful moaning call, muffled and low,

shorter and deeper than that of *verreauxi*, lacks the "bottle" sound of the latter. The bird also makes a guttural "oor" and a sort of twanging, hoarse "bo·r."

***Geotrygon veraguensis* Lawrence**

VERAGUA QUAIL DOVE

RANGE: Costa Rica to western Ecuador.

The Veragua Quail Dove, at its northern geographic limit in Costa Rica, is confined to the tropical belt on the Caribbean slope, apparently below the 1000-foot mark. Most reports are from the wet northeastern sector, none westward. Southward, after a gap, the species reappears in the very humid Sixaola region beside Panama. Its distribution is probably not interrupted, though its relative abundance perhaps fluctuates with the wetness of the life zones. It is present in fair numbers in the flat lowlands, but, in my experience, it is more common on the foothill approach to the Cordillera Central and, I suspect, the length of all the highlands.

Like most members of its genus it is a true inhabitant of "rain" forest, from which it strays occasionally to shaded, thickety, contiguous second growth. It is seen as a rule in presumably mated pairs the members of which either keep together or are somewhat separated. Sometimes it is met singly, perhaps because the companion bird has not been noticed, and also in three's. Almost strictly terrestrial, it is encountered nearly without exception pottering about on the ground. Usually it is not at all shy. Indeed, the bird is seemingly oblivious of the observer when he stands still. Frightened, it takes to the air lightly, though its flutters sound surprisingly loud in the forest, and flies a short distance to light again on the ground, hardly ever on a branch. Its usual call is a weakly explosive little "boom" or "bu," like the twang of a loose string or the damped cry of a bullfrog. A hoarse, froggy "woe" is also given.

***Geotrygon lawrencii* Salvin**

LAWRENCE'S QUAIL DOVE

RANGE: Southern Mexico; Costa Rica to western Panama.

***Geotrygon lawrencii lawrencii* Salvin**

RANGE: Costa Rica and western Panama.

The very uncommon Lawrence's Quail Dove, a Caribbean species, is known mostly from a handful of localities scattered along cool and wet subtropical ridges and slopes on the northern and eastern sides of the Cordillera Central. Elsewhere it is reported only from Tenorio Volcano. Though not recorded above the subtropical belt, it has been found somewhat lower at the northeastern base of the Cordillera Central. Its Costa Rican distribution appears to comprise a more or less interrupted chain of localities that, following a mean altitude of 2500–3000 feet, starts at the Guanacaste Cordillera, curves around the central highlands, and most likely continues along the Talamanca Range to Panama.

I found it on each of two visits only at Matrículas de Pavones, which is situated on a 3000-foot ridge overlooking the Reventazón Valley with a vista of the eastern end of the Cordillera Central and the northern end of the Talamanca Cordillera. Relying on my own inadequate experience and an acquaintance with the environment at the other collecting stations, I would characterize this species as one that inhabits mountainous terrain at the lower middle altitudes under cool and wet, partly cloud-forested conditions. Though it occurs in heavily wooded country, it frequents forest-enclosed small openings and light-flecked trails densely overgrown with low leafy vegetation. It appears to be almost entirely terrestrial and is seen singly.

***Geotrygon costaricensis* Lawrence**

COSTA RICAN QUAIL DOVE

RANGE: Costa Rica and western Panama.

This montane quail dove is known from a number of localities mostly in the central highlands, including the Dota Mountains and northern end of the Talamanca Cordillera. In addition, it has been reported from the southern, presumably Pacific, portion of the Talamanca Cordillera (Carriker, 1910, p. 406) and from Tenorio at the Guanacaste Cordillera [Ridgway, 1916 (1901–1950), pt. 7, p. 489]. Its vertical range starts at the lower limit, though more commonly from about the middle, of the subtropical belt and extends well into if not through the lower montane belt. Evidently the species does best in the middle altitudes, especially under very humid

cloud-forest conditions, in forested hilly country.

I met the species with fair regularity at La Hondura on the very wet north slope between Barba and Irazú volcanoes, only occasionally elsewhere in the central highlands. I saw it only singly and always at forested trails which this largely terrestrial bird had entered from the forest floor. Rowley (1878, pp. 44-45) quoted Boucard as follows: "'I always found them on the ground, scratching the earth like chickens, in search of insects. They have very much the same habits as *Tinamidae* and *Odontophorinae*, are very scarce . . . I found the crop full of seeds: I am therefore more certain about this kind of food than about insects, although the probabilities are that they eat insects also. All those which I killed used to go singly in the dense forests; but it is usually the case that, where one is seen, the other is not far off.'"

***Geotrygon violacea* (Temminck)**

VIOLACEOUS QUAIL DOVE

RANGE: Nicaragua to Bolivia and extreme northeastern Argentina.

***Geotrygon violacea albiventer* Lawrence**

RANGE: Nicaragua to western Venezuela.

"It is impossible to tell exactly what part of Costa Rica the range of this bird covers, there being but three records of its occurrence. . . . It would seem that the bird is practically confined to northwestern Costa Rica in the region of the volcanoes Miravalles and Tenorio, where, according to Underwood, it is not so extremely rare. The only other record is from Angostura, in the valley of the Rio Reventazón at about 2,000 feet" (Carriker, 1910, p. 404). Subsequent records include the Nicoya Peninsula (Hoja Ancha), the northern Guanacaste lowlands (El Pelón de la Altura), and the northwestern approach to Poás Volcano (Villa Quesada, altitude 3000 feet). In addition, I met it along the Guanacaste Cordillera (Rincón de la Vieja Volcano) and in the east-central Caribbean lowlands (La Lola Farm, near Madre de Dios).

The Violaceous Quail Dove occurs locally throughout its range. Its Costa Rican distribution is difficult to interpret, because the records are few and scattered among the dry

and humid life zones, the lowlands and the subtropical belt, and the Pacific and Caribbean slopes. Perhaps the species is indeed generally scarce and really absent from both sides of the southern part of the country. At any rate, it seems to be locally not uncommon along the Pacific side of the Guanacaste Cordillera. There I met it regularly on the immediate approach to and lower slopes of Rincón de la Vieja Volcano, and Underwood collected a series at Miravalles and two specimens at Tenorio Volcano.

At Rincón de la Vieja the species inhabits the forested lower slopes of the volcano, where I found it on the ground, but more often to fair heights up in the trees. The immature bird that I collected in the Caribbean lowlands was on the ground in second growth beside a shaded cacao plantation well away from tall forest. Incidentally, this quail dove has a relatively shorter and weaker tarsus as well as a shorter middle toe than the other, more terrestrial species of *Geotrygon* or the similar-sized *Leptotila* ground doves in Costa Rica. Its call is a repeated, sort of double-stopped "oo·oo," the first syllable of which is on a higher plane than the second.

***Geotrygon montana* (Linnaeus)**

RUDDY QUAIL DOVE

RANGE: Southern Mexico to Bolivia and extreme northeastern Argentina; Greater and Lesser Antilles.

***Geotrygon montana montana* (Linnaeus)**

RANGE: Southern Mexico to Bolivia and extreme northeastern Argentina; Greater Antilles and Grenada.

The neotropically widespread Ruddy Quail Dove is met uncommonly in Costa Rica despite records from a number of localities that cover much of the country. On the Caribbean side it occurs sparsely through most of the tropical belt (where still not recorded from the southeast), rises into the subtropical belt along the central highlands, but is not uncommon only at the eastern edge of the plateau region, and spills through gaps in the Guanacaste Cordillera to its Pacific slope. It is much more plentiful in the Pacific southwest (the General-Térraba-Golfo Dulce sector) from the lowlands into the lower subtropical belt, but northward on the

mainland it comes to an apparently abrupt stop at the border of the Tropical Dry Forest, yet there are at least two reports from the Nicoya Peninsula. A record from northern Guanacaste (El Pelón de la Altura) is undoubtedly referable to the population that inhabits the adjacent continental divide.

This is primarily a "rain"-forest species that also occurs in contiguous advanced second growth. An unusual occurrence, in my opinion, is that reported by Wetmore (1944, p. 41), who "shot a female in an open thicket surrounded by pastureland." The bird forages on the forest floor (where it walks with a waggling of its hindquarters), but seeks low branches on which to rest or escape danger. Personally, I happened to find it perched perhaps more often than on the ground. Of interest in this regard is the fact that its tarsus is relatively smaller than that of other Costa Rican members of the genus, excepting *violacea* in which it is still smaller and weaker. Usually it is seen alone, though probably occurring in somewhat separated pairs, and sometimes as a small group, perhaps a single family. If surprised on the ground, it may assume a frozen stance with its bill pointed downward, almost resting on the throat, or it simply sits tight whether on the ground or on a branch. The bill, incidentally, appears markedly drooped in life.

***Geotrygon chiriquensis* Sclater**

CHIRIQUÍ QUAIL DOVE

RANGE: Costa Rica and western Panama.

The Chiriquí Quail Dove inhabits the mountainous length of the country from about the middle of the subtropical belt into the lower montane belt, possibly higher. It is known principally from the central highlands, including the Dota Mountains, and has been recorded from the high Talamanca Cordillera in the southwest and the Guanacaste Cordillera (Cerro Santa María) as well as the Cordillera de Tilarán, where I met it at Monteverde. A supposed record from the Pacific lowlands (El Pozo, Puntarenas) was a misidentification of an immature *montana*. Its distribution seems to be almost identical to that of *costaricensis*, but its numbers seem to be considerably smaller. Evidently the bird prefers cool humid forest, such as that

on slopes that face the moisture-laden winds arriving from the Caribbean Sea.

Carriker (1910, pp. 407-408) wrote: "Found sparingly over the higher portions of the plateau region and the higher mountains, wherever virgin forest still persists in any quantity. I found them fairly abundant in the heavy forest near the continental divide at the headwaters of the Rio Ceibo, a tributary of the Rio General de Térraba. They are partial to the deep dark ravines, where they feed on the ground, alighting on low limbs when flushed." My very limited experience with this forest-inhabiting species includes seeing it in level tracts as well as in shaded ravines, foraging on the ground singly and in two's, walking or running away when disturbed. It has a head-bobbing gait with a hiplike swing to its hindquarters. In life, incidentally, it shows quail-like streaking or "folds" on the sides of its neck reaching the nape. Its note is a one-syllable, mournful "hoóoo," given singly or in repetition at three-second intervals.

FAMILY PSITTACIDAE

***Ara ambigua* (Bechstein)**

BUFFON'S MACAW

RANGE: Nicaragua to western Ecuador.

***Ara ambigua ambigua* (Bechstein)**

RANGE: Nicaragua to western Colombia.

Buffon's Macaw is restricted to the Caribbean slope, primarily in the lower tropical belt. It occurs higher, almost to the lower montane belt, as an irregular visitant on the Cordillera Central and probably the Talamanca Cordillera, though not reported from the latter. Nor has it been recorded from the northwestern Caribbean sector, including the continental divide, where it is undoubtedly present. It is seen most often in well-wooded regions, both inside virgin forest and in adjacent clearings with tall trees; also, it flies over intervening stretches of semi-open country.

It occurs in bands to a dozen or so members as well as in two's and three's, rarely alone. In flight the bands are seen to consist of groups of paired individuals and an occasional trio. As a rule, the birds keep very high in the trees where, camouflaged green like the concealing foliage, they may be very

noisy. Inside the forest the species reveals its presence by an occasional squawk or, like other parrots, through falling debris. In a tree-scattered opening a bird or two may fly about freely well below canopy height, even in the close presence of the observer, and it was in such a situation that I saw one worried by the comparatively tiny Bat Falcon, the territory of which had been temporarily invaded. Apparently its powerful beak can open the toughest-shelled fruits, such as the monkey pot (*Lecythis costaricensis*). The bird flies on an even keel, with rather leisurely steady beats, either circularly in an opening or in a direct line across country. In addition to squawks, the bird makes a creaking or groaning "ää."

Ara macao (Linnaeus)

SCARLET MACAW

RANGE: Eastern Mexico to Bolivia and northeastern Brazil.

The Scarlet Macaw, in contradistinction to Buffon's, is primarily an inhabitant of the Pacific slope. It is abundant in parts of the northwest, from the lowlands to the subtropical slopes of the Guanacaste Cordillera, and in parts of the Térraba-Golfo Dulce region in the southwest, mostly in the tropical belt. It laps over low portions of the continental divide from the Guanacaste side in the northwest, and there are a number of other Caribbean records from the lower slopes along the northeastern and eastern sides of the central highlands, plus another from the extreme southeastern Sixaola region. I never did find it on the Caribbean slope, where without question it used to be far more frequent. It is, or used to be, accidental on the central plateau, where I have not seen it either.

Perhaps it is significant that this macaw, which is so common in the dry-forested northwest, occurs also in the humid life zones along the Pacific face of the Guanacaste Cordillera and in the humid to wet southwest, from both of which areas Buffon's is absent. It does not enter well into forest, but frequents forest borders, patches of woodland, and open or semi-open country with scattered stands of tall trees. Generally it occurs in bands of a few to several dozen members. These, like Buffon's, are made up of indi-

vidual pairs and trios. The raucous birds keep as a rule high in the trees, adorning the foliage like gigantic gaudy flowers.

Aratinga finschi (Salvin)

FINSCH'S PARAKEET

RANGE: Nicaragua to western Panama.

Finsch's Parakeet occurs primarily on the Caribbean side of the country. Its center of distribution seems to follow the foothills and lower slopes in the upper tropical and lower subtropical belts the length of the country. The bird appears in good numbers, perhaps only seasonally, on the Pacific face of the Guanacaste Cordillera and on the Pacific side of the central plateau at least as far as San José and on the neighboring slopes to 4500 feet or more during the dry season. It occurs regularly in some places, irregularly in others, perhaps in large part as a postbreeding visitor, over the Caribbean lowlands.

Aside from its seasonal partial overlap of the Pacific side, it is known there only from the lowlands on the peninsular coast of the Golfo Dulce in the far southwest. Sassi (1938, p. 317) reported flocks of 12 to 20 individuals in April, 1930, at Puerto Jiménez. I saw it in one's or two's only twice in April, 1962, at Rincón de Osa. I did not meet it during a six-week period in 1951, on the mainland side of the Golfo Dulce. Perhaps with the removal of the lowland forests the bird will enter in increasing numbers from adjacent Panama. There is no other *Aratinga* in the southwest.

This parakeet prefers semi-open agricultural or pasture lands in which woodland alternates with clearings; it does not enter forest, except perhaps on the peripheral canopy. In extensively forested sections of the Caribbean lowlands, it seems to occur irregularly or seasonally, as mentioned above, even in suitable second-growth habitat. It is usually seen in flocks numbering a few individuals to several score, and these flocks seem to wander widely during much of the year. The birds fly as a group with short swift strokes and frequent change of direction, as do shore birds. They come to a fluttering halt on the crowns of trees and sink from sight into the foliage. The raucous cry, something like "că că că," and so on, is similar to that of the congeneric *canicularis*.

At Hacienda Miravalles, in the upper tropical belt beside the continental divide in Guanacaste, I observed what may have been communal courtship activity. This was at the height of the dry season (latter part of April and early May) in the scrubby ranch lands. A flock of maybe a hundred apparently paired individuals was in a small patch of very open, low woodland. The members of a pair billed and snuggled but also nibbled each other besides biting meddlesome neighbors. One of a pair would hang from the bare or sparsely leaved twig on which the other was perched; or both would hang by one foot, employing the other to regain the upright position or to grab the free foot of its companion. There was constant noise and activity. Individuals were climbing about, hanging, and interfering with one another; groups kept taking off in circling flights. The usually wary birds were so absorbed in their carryings on that I was able to approach them closely.

***Aratinga astec* (Souancé)**

AZTEC PARAKEET

RANGE: Northwestern Mexico to western Panama.

***Aratinga astec astec* (Souancé)**

RANGE: Southern Mexico to western Panama.

This *Aratinga* is confined to the Caribbean slope, where it is nearly restricted to the tropical belt in the lowlands and foothills the length and width of the country. Above the tropical belt it seems to have been recorded only at Cariblanco de Sarapiquí. Evidently a species of the humid life zones, it is present both in partially deforested and heavily forested areas, but it does not enter forest. It is found mostly at woodland borders and in neighboring clearings and plantations with variously sized trees. It is met more or less regularly but, except locally, not frequently.

Generally it occurs in groups of several individuals, not in the large concentrations of *finschi*. Moreover, it tends to keep much lower in the trees; it does not fly about at canopy height or above the treetops. As with parrots generally, the flocks are composed of paired individuals which, when perched, exhibit tender affection. Flight is very swift and twisting, and the birds flash past to be quickly lost from sight. The usual cry is a

high-pitched screech, different from that of the congeneric *finschi* and *canicularis*. Another cry is rather similar to one given by the Boat-billed Flycatcher.

***Aratinga canicularis* (Linnaeus)**

ORANGE-FRONTED PARAKEET

RANGE: Mexico to Costa Rica.

***Aratinga canicularis canicularis* (Linnaeus)**

RANGE: Southern Mexico to Costa Rica.

The Orange-fronted Parakeet, in Costa Rica at the southern end of its range, apparently spread southward along the relatively arid Pacific slope of the Central American isthmus. An indicator species of the Tropical Dry Forest, its Costa Rican distribution fits nicely within the boundaries of the northern half of the Pacific slope, from the lowlands to lower subtropical elevations on the Guanacaste Cordillera and across the central plateau to San José. It is most abundant in Guanacaste and the Nicoya Peninsula, less and less common with distance from the center of distribution.

As a rule it occurs in flocks of several individuals to several score. On the central plateau it is represented by wandering groups, some of them apparently seasonal residents in the plazas of towns, rather than the large concentrations in which it is met in the northwest. It is, of course, strictly arboreal in the ranch lands of the subhumid northwest and the agricultural areas, plantations, and pastures that rise eastward from the entrance to the Gulf of Nicoya to the coffee fincas of the central plateau during the well-marked dry season. Yet it seems to be quite absent from the relatively humid Río Frío region of similar aspect to the drier environments in Guanacaste. Subsisting on tree-borne fruits, it necessarily travels about in search of feeding areas within its climatic confines. Its usual call is a raucous "can·can·can," and so on (or "ca·ca·ca," and so on), similar to that of the congeneric *finschi* and also very much like that of the sympatric *Amazona albifrons*. At other times it sounds screechy.

***Pyrrhura hoffmanni* (Cabanis)**

HOFFMANN'S PARAKEET

RANGE: Costa Rica and western Panama.

Pyrrhura hoffmanni hoffmanni (Cabanis)

RANGE: Costa Rica.

Hoffmann's Parakeet is distributed through the highlands over the southern half of the country, from the hilly Caribbean approaches to the central plateau and the mountains along the southern edge of the plateau southward through the Dota region and along both slopes of the Talamanca Cordillera. Apparently it does not quite reach the Cordillera Central, even though it occurs from time to time in the scrubby terrain between Cartago and Paraíso at the foot of Irazú Volcano. Vertically it ranges from the middle of the subtropical belt well into the lower montane belt, though it is also found a little lower to about 3000 feet. For the most part it frequents forested ridges and hillsides in brokenly wooded country.

The species generally keeps in small flocks which are hard to locate and approach in woodland, yet at times the usually wary birds will remain in branches only a few yards above the observer. At other times they can be seen crossing the semi-open fairly low, their wings flashing yellow. The birds chatter without screeching, and the unparrot-like cries of a flock can sound like a weak whirring or bring to mind a noisy group of songbirds. Occasionally they sound more like Tovi Parakeets.

Bolborhynchus lineola (Cassin)

BARRED PARAKEET

RANGE: Southern Mexico to Peru and Venezuela.

Bolborhynchus lineola lineola (Cassin)

RANGE: Southern Mexico to western Panama.

The little Barred Parakeet is known mostly from the central highlands: the foothills along their Caribbean edge, the mountains bordering the central plateau on the south, and the Cordillera Central. It is also present, as might be expected, along the Talamanca Cordillera, but in unknown frequency. There is no report from either of the northwestern cordilleras. Vertically, it ranges from the mountaintops downward to the lower subtropical belt, where it is local. In addition, I found it several times in January at upper tropical-belt elevations near Buenos Aires in the southwest.

The bird is seen only occasionally, usually in flocks that vary in size from six or 12 to 50 or 75 individuals, generally in high rapid flight. The species evidently prefers well-wooded, only partially deforested areas, including the parklike pastures with tall trees on the big volcanoes. Usually it keeps high in the trees. Its rapid flight is accompanied by cries of the sort associated with a flock of small songbirds.

Brotogeris jugularis (Müller)

TOVI PARAKEET

RANGE: Southern Mexico to Colombia and northern and west-central Venezuela.

Botogeris jugularis jugularis (Müller)

RANGE: Southern Mexico to Colombia and extreme western Venezuela.

The abundant Tovi Parakeet is nearly confined to the Pacific slope the length of the country. It has two centers of distribution, one in the dry-forested northwest, the other in the Térraba-Golfo Dulce region of the far southwest. A tropical-belt species, it is known to be resident in the lower subtropical belt only along the Guanacaste Cordillera, perhaps also along the Cordillera de Tilarán, and occasionally it rises upon the approach to the central plateau. It enters the northern and northwestern Caribbean lowlands by way of the south shore of Lake Nicaragua. It was reported common in February in the San Carlos region by Boucard (1878, p. 46), and I found it abundant in April in the open Río Frío region. Evidently the species thrives in the driest and wettest lowland areas in Costa Rica, yet it is totally excluded from most of the Caribbean slope.

The bird frequents semi-open and partially deforested areas, preferring large openings and clearings with tall trees and often perching on high bare branches. For the most part it occurs in groups numbering up to 20 apparently paired members, occasionally as a lone pair, extremely difficult to find amid foliage. The birds fly very rapidly with many twists and changes of direction; sometimes they alternate series of beats and a sail. They are very noisy. The usual utterance is a harsh rasping continuous chatter of quick short notes on the same level, sounding like a scratchy "ră·ă·ă·ă·ă·ă" or "ack·ack·ack," and so on.

This lively little bird is popularly kept as a

household pet. Forever eager to satisfy its curiosity, it climbs and hangs mischievously, swaggers and sidles ludicrously, or hastens about in a funny pigeon-toed walk. It responds to affection, yet may take a personal dislike to a stranger. It learns to speak poorly, but may coarsely pronounce "perico" with the correct tone of endearment.

Touit dilectissima (Sclater and Salvin)

RED-WINGED PARROTLET

RANGE: Costa Rica to northwestern Ecuador and western Venezuela.

Touit dilectissima costaricensis (Cory)

RANGE: Costa Rica and western Panama.

The Red-winged Parrotlet seems to have been taken only twice in Costa Rica. Four specimens were collected in May, 1910, by H. F. Raven, supposedly near Puerto Limón. It was taken again in October, 1922, by Austin Smith at an altitude of 4300 feet at Santa Cruz on Turrialba Volcano. I met it twice in October, 1953, at Matrículas de Pavones situated on a 3000-foot forested ridge overlooking the Reventazón Valley and in plain sight of Turrialba Volcano. There is no other report.

This little parrot, as represented by *costaricensis*, is undoubtedly rare in its range. It is probably a bird of the cool and wet lower middle altitudes; the Puerto Limón specimens may have been a wandering group taken perhaps in the foothills. Though not recorded between the above localities and Boquete, Chiriquí, on the Pacific slope of Panama, it probably occurs along the Talamanca Cordillera in Costa Rica, where I suspect it is confined to the Caribbean slope.

The few birds that I observed were in medium-sized trees at the forest border. They were with the barbet *Eubucco bourcierii* and the tanager *Buthraupis arcaei*, both indicators of cool, very wet portions of the hilly subtropical belt. Both sexes were present. The only sound that I heard was a chatter. At the same locality I found four other parrots (*Aratinga finschi*, *Pyrrhura hoffmanni*, *Pionopsitta haematotis*, and *Pionus senilis*), of which only the first and last were common.

Pionopsitta haematotis (Sclater and Salvin)

BROWN-HOODED PARROT

RANGE: Southern Mexico to western Ecuador.

Pionopsitta haematotis haematotis

(Sclater and Salvin)

RANGE: Southern Mexico to western Panama.

The Brown-hooded Parrot has the broadest Costa Rican range in its family, as it is found in the humid life zones of both slopes from sea level to 10,000 feet. Its centers of abundance and local frequency are, however, uncertain. Thus, it is uncommon in some places, very common to abundant in others. It is most numerous in the tropical belt, much more so on the Caribbean side than on the Pacific, yet it seems to be quite scarce in the extreme southeast. From the Caribbean side it laps over the Pacific face of the northwestern divide and rises up the central highlands well into the montane belt, a vertical spread matched by few other birds. In the southwest, where it is abundant only in the Golfo Dulce region, it is known upward to the middle of the subtropical belt at only three localities, but it undoubtedly rises considerably higher.

The species occurs, as a rule, in well-wooded humid to very wet areas. Hence it is absent from all the Tropical Dry Forest, the largely deforested central plateau, and the open reaches of the Térraba region, but is present in neighboring areas with humid forest. It is encountered regularly well inside forest and also along woodland borders and adjacent tree-scattered clearings and plantations. Usually it is seen in rapidly flying groups of several to a dozen or more individuals. It feeds at all heights in the trees, even descending occasionally to the understory in heavy forest. Its voice, which is not so screechy as that of the White-crowned Parrot, I have transcribed as "kreétee-yer," like the sound of an iron pulley.

Pionus menstruus (Linnaeus)

BLUE-HEADED PARROT

RANGE: Costa Rica to Bolivia and Mato Grosso.

***Pionus menstruus rubrigularis* Cabanis**

RANGE: Costa Rica to western Ecuador.

The Blue-headed Parrot, at its northern limit in southern Costa Rica, has there been recorded previously from four localities, and I met it at another three. It is primarily a Caribbean species known thus far only from the tropical belt, mostly the coastal-plain lowlands, which it seems to have entered rather recently from Panama. It was not listed by Carriker. On the Caribbean side, where I have seen it from time to time, it is uncommon to fairly common to the limit of its range at approximately the Río Pacuare north of Puerto Limón. On the Pacific side, the presence of the species was first made known by Austin Smith, who collected it close to sea level at the Río Coto in the wet-forested Golfo Dulce region near Panama; it has not been found farther north.

This parrot usually occurs in groups of several individuals, sometimes singly, in tree-scattered clearings and openings and shaded cacao plantations, but apparently not inside woods. Its general habits seem not to differ from those of the sympatric *senilis*, which it resembles in general appearance. Its wing stroke, however, is considerably shallower, more like that of an Amazon parrot.

Pionus senilis* (Spix)*WHITE-CROWNED PARROT**

RANGE: Southern Mexico to western Panama.

***Pionus senilis decoloratus* Griscom**

RANGE: British Honduras and adjacent Yucatan to western Panama.

The White-crowned Parrot is abundant over much of the country in the humid life zones. It ranges commonly from the lowlands on both slopes to the lower subtropical belt, above which it decreases rapidly in numbers and reaches its upper limit locally at approximately the transition to the lower montane belt. It has not been recorded from the Tropical Dry Forest, the northwestern divide, or the northwestern Caribbean lowlands, though probably present in the last. Despite a couple of records from the Pacific side of the central plateau, the bird is surely only a straggler there.

This parrot is typically an inhabitant of semi-open areas, such as have been partially deforested for plantations and field crops, alternating with stands of trees, blocks of woodland, wooded borders and slopes, open woodland, and second growth with emergent trees. Occasionally it occurs fairly well inside forest, either in the crowns of tall trees or flying over the canopy. It is usually seen in flocks of a few birds to several dozen. It is also met singly during the breeding season, usually at a hollow stub in opened woodland.

The birds are very noisy in the air, screeching as they fly rapidly and twist in unison as they often alter the line of flight. In the trees, where they move about deliberately, climbing with great care, they are generally silent, except for the immatures which keep up a distinctive dithering chatter that claims the attention of the adults.

Amazona albifrons* (Sparrman)*WHITE-FRONTED AMAZON PARROT**

RANGE: Northwestern Mexico to Costa Rica.

***Amazona albifrons nana* W. DeW. Miller**

RANGE: Southern Mexico to Costa Rica.

The White-fronted Amazon Parrot, a member of the Central American arid Pacific avifauna, is confined to the Pacific northwest. One of the common indicators of dry-forested Guanacaste, it is plentiful upward into the subtropical belt on the deforested slopes of the Guanacaste Cordillera. Its numbers become greatly reduced south of the head of the Gulf of Nicoya, and it does not seem to have been reported even as a straggler on the central plateau or the southern shore of Lake Nicaragua. In Costa Rica its distribution appears to be controlled by climate rather than the presence or absence of competing species.

The bird frequents open and semi-open country with scattered trees and stands of open woodland characteristic of the scrubby Guanacaste ranch lands. It occurs in two's and three's, also in larger groups, sometimes in large flocks. Its shallow wing beats, not fluttering above the horizontal, are typical of *Amazona*, but its continually veering flight, like that of an *Aratinga*, is not. A

noisy bird, it makes a raucous, sometimes squealy "ca-ca-ca-ca," similar to that of the sympatric *Aratinga canicularis*, or a somewhat altered "cacáck cacáck," with a "tsirk-ing" quality. Its voice is thus quite different from that of other Amazon parrots of Costa Rica. Moreover, it croodles little.

***Amazona autumnalis* (Linnaeus)**

RED-LORED AMAZON PARROT

RANGE: Southern Mexico to western Ecuador and northwestern Brazil.

***Amazona autumnalis salvini* (Salvadori)**

RANGE: Nicaragua to western Venezuela.

The Red-lore Amazon is distributed on both slopes, primarily in the humid life zones of the tropical belt. It is absent from most of the dry-forested northwest, having been taken only in the southern portion at one locality in the Nicoya Peninsula and at another on the mainland side at the entrance to the Gulf of Nicoya. Old records from San José apply to birds brought up from the coast for sale (Frantz, 1869, p. 365). On the Caribbean side, where common throughout the lowlands, it rises to wet portions of the northwestern divide, the Pacific face of which it overlaps slightly at lower subtropical elevations, and occasionally to the lower limits of the subtropical belt along the Cordillera Central. It is generally less plentiful in the southwest, where it hardly rises, if at all, above the tropical belt, yet it seems to be abundant on the Osa Peninsula. Individuals from the northern half of both slopes show a bit of yellow on the sides of the head, but are referable to *salvini* rather than the distinctly marked *autumnalis* of northern Central America.

A nonforest species, it occurs in extensively forested regions and in partially deforested areas. Departing a roosting site for feeding grounds in the morning and returning at dusk, the flying birds usually form a loose company of individual pairs well separated from one another. The birds frequent plantations and clearings with trees, tree-lined borders of one sort or another, patches of woodland, forest edges, and second growth with emergent trees. Feeding birds argue from time to time, when they emit a sudden psittacine growl. In fact, I once saw two of them, fighting while locked

in a fluttering embrace, crash down into the undergrowth. The winner, with some feathers in its beak, gave voice to a harsh even ripple and the unprepossessing loser flew off, I suppose banished to forage elsewhere.

The bird is usually noisy in flight, sometimes while perched. Its variable cry, which differs from that of its sympatric congener, *farinosa*, is a short-note "kyike kyike r·kyike kyike," and so on, or "kyake kyake kyake," and so on, or "yoik yoik," and so on, enunciated quickly, with the quality of a parrot, and often mixed with or followed by croodles. The bird also makes an "ack-ack" or "eck-eck" or "chek-chek," short notes that sound like buzzy grunts, and a rippling, gibbering "ffrik."

***Amazona ochrocephala* (Gmelin)**

YELLOW-HEADED, YELLOW-NAPED, AND
YELLOW-CROWNED AMAZON PARROTS

RANGE: Mexico to Peru and Mato Grosso.

***Amazona ochrocephala auropalliata* (Lesson)**

YELLOW-NAPED AMAZON PARROT

RANGE: Southern Mexico to Costa Rica.

The Central American form, *auropalliata*, at its southern limit in northwestern Costa Rica, occurs as a typical member of the arid Pacific avifauna. It is centered in the Tropical Dry Forest and rises on the adjacent lower slopes of the Guanacaste Cordillera. It does not reach the approaches to nor does it occur on the central plateau. Although listed for San José, it is present there only as a pet. On the other hand, Frantz (1869, p. 365) reported it from the wet-forested Sarapiquí lowlands, where he saw it in pairs returning at twilight to roost. I did not see it there during an entire year, but people native to the area spoke of a large green parrot with a yellow nape that could be only this species. Farther west in the northern Caribbean lowlands, at Los Chiles in the Río Frío region, I did find a bird or two flying the same course from roosting to feeding site very early every morning of my stay.

In Guanacaste the bird is perhaps most common in the lower Tempisque basin, where scrubby cattle lands alternate with marshy lagoon type of country. It is seen commonly, too, over the rest of the dry-forested lowlands, including the more humid agricultural

portion at the mainland entrance to the Gulf of Nicoya. It occurs singly, in two's and three's, and in larger groups, often close to settlements. Generally it keeps high in the trees. Habitually it takes off silently from a perch, except for flapping sounds, when startled. It utters an iterated, parrot-like "kurrowk," as well as rather deep, not raucous, very human-sounding calls that bring to mind a person trying to imitate a parrot. Even in flight its cries have a human quality, unlike those of the other Amazons. Its reputation as one of the best talking parrots is deserved.

***Amazona farinosa* (Boddaert)**

PLAIN-COLORED AMAZON PARROT

RANGE: Southern Mexico to Peru and Mato Grosso.

***Amazona farinosa virenticeps* (Salvadori)**

RANGE: Nicaragua to western Panama.

The Plain-colored Amazon occurs on both humid-forested slopes, primarily the Caribbean. Distributed over most of the tropical belt, it rises uncommonly to wet places along the low crest of the continental divide north from the Arenal gap and to the middle of the subtropical belt along the Cordillera Central, where common only in the hilly country at the eastern end. On the Pacific side it is generally scarce yet locally abundant. Recorded once on the central plateau, it probably occurs there no longer. An old record from San Mateo, on the relatively dry, lowland approach to the central plateau, perhaps applies to the nearby Aguacate Mountains. It is evidently scarce in the General-Térraba region, from which I find only one record. I met it once in the lower subtropical belt closer to Panama. In the wet Golfo Dulce lowlands, however, I found it common at Esquinas on the mainland side and abundant at Rincón on the peninsular side.

In Costa Rica it is almost completely sympatric geographically and ecologically with *autumnalis*, but is appreciably more abundant in the wetter portions of the range and also in the subtropical belt. In general, it is most numerous in heavily wooded regions, yet it is not a true inhabitant of forest. Rather, it prefers the borders of forest and nearby clearings and plantations with tall

trees or similar habitat. It occurs in groups of varying size composed, for the most part, of paired individuals. Its voice is deeper than that of *autumnalis*, and its cries are made instantly recognizable when accompanied by several comical-sounding "toot" 's.

FAMILY CUCULIDAE

***Coccyzus erythrophthalmus* (Wilson)**

BLACK-BILLED CUCKOO

RANGE: Breeds in eastern North America; winters in northern and northwestern South America.

The Black-billed Cuckoo is an uncommon to rare passage migrant; there is no winter record. It arrives by the first of October, possibly a bit earlier, and is not met after mid-November. It is seen again in the spring from the first part of April through the third week of May. In my experience, it is regular only in the Caribbean lowlands and, to a lesser extent, the subtropical belt along the Cordillera Central. In addition, it has been recorded twice from the central plateau and once from the Térraba region in the southwest. The widely scattered records would lead one to expect it almost anywhere in the country, save possibly the dry northwest. The transient bird prefers semi-open country, such as parklike areas, plantations, and the edges of clearings next to woodland, provided medium-sized and shrubby trees are available for cover. I have seen it only singly, both adults and immatures, none of which made a sound.

Both this species and the following (*C. americanus*) are long, slender birds. Perched, their wings seldom lie flat, and the tertials from either side meeting above the midline of the upper back enclose a hollow. The rest of the wing, containing the long flight feathers, narrows rapidly, and the two wings bow away from each other so that the lower back and rump are exposed. The wings seem too large for the size of the bird, while the body appears too slender to fill the empty space beneath the overlying wings and too narrow to keep the shoulders apart.

***Coccyzus americanus* (Linnaeus)**

YELLOW-BILLED CUCKOO

RANGE: Breeds in North America and West Indies; winters chiefly in South America.

***Coccyzus americanus americanus* (Linnaeus)**

RANGE: Breeds in eastern North America and West Indies; winters chiefly in South America to Argentina.

***Coccyzus americanus occidentalis* Ridgway**

RANGE: Breeds in western North America; probably winters chiefly in South America.

The Yellow-billed Cuckoo occurs as a transient and visitant. It has been recorded as early as August in the fall, but is usually not seen until September–October. The only spring records, June 10 and 11, 1937, are Underwood's. Whether these last be in error or not, the species almost surely occurs during the spring migration, too. The race *americanus* is the one usually encountered in Costa Rica. That *occidentalis* does reach the country at least occasionally is "proved by an extremely characteristic example taken at San José, Oct. 25, 1905" (Bangs, 1908, p. 23). Its measurements, though relatively large, all fall within the extensive range of overlap with *americanus*.

The species is seen irregularly, more or less accidentally, during the fall migration. It seems to tarry much longer and in much larger numbers in some years than others. It is apt to appear almost anywhere, from the lowlands of either slope to the central plateau, but, in general, it prefers the coastal routes. In October, for example, I met aggregations of loosely associated individuals in beach scrub and low trees. Their daytime sluggishness suggested they had been traveling at night. In smaller numbers the species also passes through the lowlands behind the coast, at least on the Caribbean side. Rare and apparently very local in winter, it may, in favorable years, be encountered from time to time in the lowlands alongside and at the head of the Gulf of Nicoya.

This cuckoo is usually seen singly, screened as a rule by the foliage in a leafy small tree. If approached closely, it flies a little distance or moves to a better-concealed branch deeper or higher in the same tree. It seems to show an attachment to a particular site, to which it often returns even when frightened away. Generally it sits quietly and looks about slowly. It may walk along a limb, pausing to lean down to a leaf cluster or "falls" and

flutters in front of it. Sometimes it descends to rest on a large leaf, a log, or even the side of a trunk close to the ground. Its slow, poorly sustained flight together with its pointed, long, and narrow wings may suggest a long-tailed Sparrow Hawk (*Falco sparverius*) slowed by a head wind.

Coccyzus minor* (Gmelin)*MANGROVE CUCKOO**

RANGE: Southern Florida, West Indies, and Mexico to northern coast of South America and coast of Brazil to the Amazon River.

***Coccyzus minor palloris* Ridgway**

RANGE: Pacific coast, Mexico to western Panama.

***Coccyzus minor continentalis* van Rossem**

RANGE: Eastern Mexico to eastern Panama.

My experience with the Mangrove Cuckoo agrees almost entirely with Carriker's (1910, p. 564): "Mr. Cherrie reports it to be found on both coasts and in the interior up to 6,000 feet, but I have never seen the bird on the Caribbean slope, nor do I know of any specimens which were taken there. In fact I believe it to be confined to the Pacific slope, rare on the higher portions and only to be found in comparative abundance on the western side of the Gulf of Nicoya." The species is indeed relatively common in the northern half of the Pacific side, from the dry-forested lowlands on both sides of the Gulf of Nicoya to the slopes of the Guanacaste Cordillera. It has also been found southward along the Pacific coast to Panama; I encountered it, once, near Buenos Aires in the upper Térraba Valley. It is rare on the central plateau, where recorded from San José. There is still no report from Caribbean Costa Rica, though Richmond (1893, p. 518) found it nearby at Greytown, Nicaragua.

The racial situation is far from clear. Van Rossem wrote (1934, p. 389): "The race *palloris* is apparently confined, in Central America at least, to the mangrove association of the Pacific coast, and is replaced a few miles inland by the very different *continentalis*," and (Dickey and van Rossem, 1938, p. 212) "while the name 'mangrove cuckoo' is inap-

plicable, locally speaking [El Salvador], to the interior race, *continentalis*, it is most appropriate for *palloris*, which, like the mangrove warbler and ochraceous vireo, seems to be confined strictly to the mangrove association, seldom or never straying even a short distance inland." In Costa Rica, however, the inland *continentalis* has been taken in the Pacific mangroves inhabited by *palloris*. The mangrove-inhabiting *palloris* also occurs, apparently more commonly, several miles inland from the coastal mangroves and even well into the interior of the northwestern lowlands; there is also the record from the central plateau (San José). There seem to be no breeding-season records or any from the summer and fall. Possibly both races are largely or entirely visitants from the north. Further observations are needed to clarify the resident status of the bird.

This cuckoo is usually seen both in mangroves and, more often, in groves away from mangroves, generally fairly well up in the trees. A deliberately acting, sedentary bird, it may remain a long while in the same tree, perched crosswise on a branch or sometimes lengthwise. From time to time it slowly leans its head forward and almost constantly turns it about as if to spy items of food. Changing sites, it hops along branches and makes short leaps to others. It utters individual "whip"'s, "wheep"'s, or "whyip"'s of flycatcher-like quality. A note similar to the last is repeated in a sort of patterned series: the first note or two weak, the others given about every half second with somewhat increasing intensity.

***Piaya cayana* (Linnaeus)**

SQUIRREL CUCKOO

RANGE: Central Mexico to Bolivia and northern Argentina.

***Piaya cayana thermophila* Sclater**

RANGE: Eastern Mexico to Colombia.

***Piaya cayana stirtoni* van Rossem**

RANGE: El Salvador to northwestern Costa Rica.

The Squirrel Cuckoo is one of the most common, most widely distributed, strikingly colored, and best-known birds in the country. It can be expected almost anywhere

there are trees, large or small, thickly foliaged or bare. It is abundant at all elevations in its range, whether wet-forested or dry-forested, in second growth, hedgerows, scattered trees, and thickets. It is seen most often between 10 and 30 feet up in trees in partially cleared areas, seldom higher than the tops of trees of medium height. In solid forest, where it is relatively uncommon, it keeps to the canopy. The race *stirtoni*, which extends southward into northern Guanacaste, meets and intergrades with *thermophila* southward to about the entrance to the Gulf of Nicoya in the Tropical Dry Forest. Over the rest of the country, from sea level along both slopes through most of the lower montane belt, the species is represented by *thermophila*.

The bird always attracts attention in the air. Alternating a few flaps and a sail, it flies delicately and slowly, never more than a short distance, and generally lights in shrubbery or concealing arboreal vegetation. Especially apparent in flight, which is often hardly more than a wing-assisted glide, are its long tail and short rounded wings, relatively proportioned as are those of an ani. Having come to rest, the bird may remain still for a long time and permit a close approach without alarm. It creeps amid branches, sometimes running along or leaping among them as actively as a squirrel, to which its long tail adds resemblance. Typically, when perched, the bird exhibits a raising and lowering of its tail. As a rule it seldom goes to the ground, yet at times and places it does so regularly. Occasionally it descends to a low stump or a log which it investigates carefully for prey. Though numerous in individuals it is usually seen singly or at most in two's.

It has several distinctive sounds. Most characteristic is an arresting "skwík, ahhhhh." A common, almost as definitive a cry is a doubled or trebled short sharp "djít." Another, "chíkarah," is somewhat like the cry of a Kiskadee Flycatcher, but deeper, coarser, and with the last syllable often prolonged. Still another is a croaking "reh·eh·eh·eh," essentially a single long note. The bird also makes a short chatter, a low rattle or vibratory "chuck," and a sharp "tsik." Particularly during the breeding season it gives voice regularly to a formal call consisting of an iterated sharp "küp."

Crotophaga ani* Linnaeus*SMOOTH-BILLED ANI**

RANGE: West Indies and islands off eastern Mexico and Central America; southwestern Costa Rica to Ecuador and northern Argentina.

The Smooth-billed Ani probably entered southwestern Costa Rica from adjacent Panama during the past generation, apparently at about the same time as the clearing of forest for the establishment of banana plantations in the wet Golfo Dulce lowlands. The first report was by Austin Smith (1932), who found a small colony December 26, 1931, at the Río Coto. The species is now present in suitable habitat on both sides of the Golfo Dulce, whence *sulcirostris* has been reported only at Puerto Jiménez, and occurs in fair numbers northward into the Térraba and General regions, where it is sympatric with *sulcirostris* to at least the middle of the subtropical belt along the slopes and spurs of the Talamanca Cordillera.

In general habits and habitat it is not noticeably different from *sulcirostris*. It occurs in open and semi-open situations, such as agricultural and pasture lands, even in bay-like openings nearly enclosed by forest, and frequents shrubbery, regenerating vegetation, fence posts, and small and medium-sized trees. A gregarious bird, it keeps as a rule in small pure groups, but I have also seen it side by side with *sulcirostris* in the same shrub. Its typical call distinguishes it at once from *sulcirostris*. This is a protracted, whining, upwardly inflected "oiiiiink" (or "woyrnk" or "oo·errnk"). However, especially in flight, it makes a *sulcirostris*-like, rattling tinkle. The bird also gives a squeaky chuckle.

Crotophaga sulcirostris* Swainson*GROOVE-BILLED ANI**

RANGE: Southern Texas and southern Baja California to Peru, northwestern Argentina, and British Guiana.

***Crotophaga sulcirostris sulcirostris* Swainson**

RANGE: Southern Texas to Peru, northwestern Argentina, and British Guiana.

The Groove-billed is the ani known to everyone in Costa Rica. It occurs on both

slopes, from sea level to the lower limits of the montane belt in the central highlands, except for virtually all the wet-forested extreme southwest, where it is complemented by the Smooth-billed. It is one of the most common birds in open country, especially that which has been cleared by man. It is absent from or scarce in extensively forested regions, which it may enter along penetrations flanked by suitable habitat. Its almost invariable association with cattle has given rise to the name "tickbird" in English and "garrapatero" in Spanish. Although it does pick parasites from cattle, it feeds to a much greater extent on the insects stirred up or exposed in the grass by livestock; for a similar reason it visits a freshly mown meadow or lawn. It also occurs in open places where there are no cattle. I have even seen it with army ants.

Tame and gregarious, it associates in small parties of its own kind, never in large flocks. One bird seen guarantees the presence of others in the neighborhood (except for pioneering individuals in forested regions). The bonds are rather loose. An individual may be perched on a branch or a wire, another standing on the ground, another sailing to a nearby bush, perhaps still another may be sitting atop a small tree. Often two affectionate birds, sometimes three or four, perch serenely side by side, like parrots. Should they be overtaken by an impulse to move onward, they do so as a group, but a straggling one. Individuals seem to be sedentary in a particular area, at least for periods perhaps of seasonal length.

In both species the long tail appears weakly attached, as it hangs loosely and blows about in any breeze. When a bird settles on a perch or hops on the ground, its tail flopping over the back seems almost to waft it head over heels. It generally perches not far from the ground, rarely at any great height. Usually it sits in one place, climbing little among the branches. Afoot, the shortness of the legs is very apparent, and the tail, extended almost horizontally, may rest on the ground. Either the bird walks clumsily or makes awkward hops approaching leaps. Flight is slow, on a perfectly even keel, and consists of several quick flaps alternating with a glide. Skutch (1959b, p. 309) noted that the Smooth-billed

is an even poorer flier than the Groove-billed, the latter easily eluding pursuit by the former. The flying ani seems to be more immediately concerned, so to speak, not to lose its balance than with speedy attainment of its objective. The ani, in short, is ungainly in appearance and graceless in its actions.

The distinctive call notes of the Groove-billed are of two similar types. One is a metallic "chewink," accented on the second syllable. The other, a rapidly repeated "chéwink" (or "chwink"), with the accent on the first syllable, is given when the bird is excited or in flight. Its Costa Rican popular name, "tijo," is a good approximation. Another call, or "song," given by a lone bird, is a series of trogon-like "pup"'s (or "püp," "purp," or "powp"), to which the tail vibrates in time. The bird also utters a characterless "chuck" and a scratchy, froglike note.

***Tapera naevia* (Linnaeus)**

STRIPED CUCKOO

RANGE: Southern Mexico to Bolivia and north-central Argentina.

***Tapera naevia excellens* (Sclater)**

RANGE: Southern Mexico to Panama.

The Striped Cuckoo is primarily a Pacific species. Its center of abundance is in the northwestern Pacific sector, especially around the Gulf of Nicoya and the approaches to the central plateau. In diminished numbers it reaches suitable habitat along the lower slopes, locally higher to at least 4000 feet, of the northwestern divide and across the plateau region almost if not quite to San José. In addition, I found it common in the Río Frío region of the northwestern Caribbean lowlands, to which it is probably distributed continuously from northern Guanacaste along the southern shore of Lake Nicaragua. Southward, it occurs, so far as known, coastally at least to Dominical, where I found it uncommon. Oddly, there is no record from, nor did I encounter it in, the General-Térraba region, where a bird that could only be this one was described to me. Farther south, however, I found it abundant at 1100 feet in the lower Coto Brus Valley and present but not common in the wet lowlands on both sides of the Golfo Dulce.

The bird evidently prefers scrubby coun-

try and field type of habitat, with thickety, brushy, shrubby vegetation and a scattering of medium-sized trees over the major portion of its range. Yet one that I collected in the very wet Coto district near the Golfo Dulce was in dense leafy shrubbery at the edge of a small marsh inhabited by gallinules (*Porphyryula*). Invariably I have seen it singly, usually after alerted to its presence by its call. It keeps from about eye level to 20 or perhaps 30 feet up, usually in concealment. When calling, however, it may perch openly on a fence post. Rarely have I observed it in protracted flight other than crossing a river, but on one occasion I saw a bird fly a good distance at a height of some 50 feet along the edge of a patch of woodland. Proportioned like a typically long-tailed, short-winged cuckoo, it flew with steady beats on an even keel.

This cuckoo is seldom seen on the ground, and rarely does one chance to note its peculiar behavior afoot. Unexpectedly this usually secretive bird may sail down to a bare or grassy opening, oddly oblivious of the observer. Here it scurries about, lifting and lowering the crest on its quail-patterned head at every halt. Spreading its "shoulders" apart, the otherwise motionless bird twists its now prominently angled, folded wings first to one side, then to the other, in a fitful shrugging, as though it had an unreachable itch in the middle of its back, thus exposing its bright rump and upper tail. At the same time it alternately extends forward and expands vertically either alula, transformed into a black-gloved "hand," which it jerks rapidly, like a semaphore flag, through a number of set positions. These bastard-winged maneuvers, synchronized with a shrug of the corresponding shoulder, are performed independently on either side. A parallel performance that suggests itself is the alternate arm flexing by male Polynesian dancers. The silent bird next draws in its head, flattens its crest, hunches to the ground, scuttles a few yards, stops, and repeats the stylized ritual. Snatching at prey from time to time, the bird seems intent on feeding rather than attracting a mate.

The usual call is a highly ventriloquial, two-note, metallic whistle, with the second note a step higher than the first. It may be given about every five seconds for minutes on end. Irregularly a third note another step

higher and sometimes a fourth are added; the final note may also be a step lower. Another cry consists of about three slow "weep"'s, successively higher pitched, that terminates with a rapid "weéteet." The crest moves up and down while the bird vocalizes.

Morococcyx erythropygus (Lesson)

LESSER GROUND CUCKOO

RANGE: Mexico to Costa Rica.

Morococcyx erythropygus erythropygus (Lesson)

RANGE: Southern Mexico to Costa Rica.

The distribution of this Central American cuckoo, terminating in northwestern Costa Rica, is typical of the arid Pacific avifauna. One of the characteristic species of the Tropical Dry Forest, it extends to the deforested slopes of the Guanacaste Cordillera and, in diminishing numbers, to the central plateau as far as San José. Its southern limit is the Río Grande de Tárcoles, marking the transition to the humid southwest. This strong-legged semiterrestrial species frequents dense thickety growth and shrubbery in scrubby deforested areas, including overgrown edges of clearings, fields and pastures, and understory in patches of seasonally dry woodland. It is met singly and sometimes in two's.

Usually it is seen when flushed from concealment; sometimes it shows itself voluntarily, as on the lower strands of a barbed-wire fence, for example. It may rise suddenly with a rapid beating of its wings when disturbed, but it soon settles in dense ground cover or in thickets. Wetmore, in Guanacaste, observed that "sometimes they flew rapidly and expertly for 70 or 80 yards before dropping down again into cover" (1944, p. 45). Usually it walks stealthily, perhaps with a weak, chicken-like bobbing of its head, but it changes to springy hops to cross an opening, to move about among branchlets, or to mount a log. Its long tail is sometimes carried cocked; I have seen it upraised by a bird running along a branch. When making an occasional abbreviated flight, say, to cross a trail, it resembles an ani in proportions; it lands with a little run.

It has a distinctive call generally not repeated for a lengthy interval, hence it is

known in Guanacaste as the bird that "gives the hour." It starts slowly, picks up speed while rising up the scale, then slows haltingly; sometimes it begins with a "weeteé" or "weéteehee." It sounds to me like a traffic whistle, but sometimes it consists of clear mellow whistles. The bird also makes a soft gargle with raised head and open mouth.

Dromococcyx phasianellus (Spix)

PHEASANT CUCKOO

RANGE: Southern Mexico to Bolivia and extreme northeastern Argentina.

Dromococcyx phasianellus ruficularis Lawrence

RANGE: Southern Mexico to Colombia.

This rarely seen species, so far as known, is virtually confined to the Pacific slope. It has been recorded scatteringly from the head of the Gulf of Nicoya to the Panamanian border and from the lowlands well into the subtropical belt, possibly into the lower montane belt in view of its having been taken somewhere near Santa María de Dota and at Estrella de Cartago. It would appear to be least uncommon in parts of the upper Térraba Valley, judging from the descriptions of the bird by some of the people who live there. Carriker (1910, p. 569) had two interesting meetings with it. I did not find it despite patrolling a particular area in which it was said to be rather common and where I heard rather distinctive *Tapera*-like calls.

Neomorphus geoffroyi (Temminck)

GEOFFROY'S GROUND CUCKOO

RANGE: Nicaragua to Bolivia and Brazil.

Neomorphus geoffroyi salvini Sclater

RANGE: Nicaragua to western Colombia.

This seldom-seen Caribbean species is distributed over most of the humid-forested tropical belt, upward into the lower subtropical belt along the central highlands, probably also on the Talamanca Cordillera. Locally it overlaps the Pacific face of the Guanacaste Cordillera at upper tropical and lower subtropical elevations. Evidently it prefers heavily forested, broken country from the first foothills inland to the lower slopes of the mountains. This large, strong-legged cuckoo is terrestrial in that it forages chiefly on the

ground, but it also perches in the forest understory.

I had only three experiences with the species. The first time, I encountered a single bird on a forested bank of the Río Reventazón at 2000 feet. This individual was fairly tame. I was impressed by its large size, long and full tail, caracara-like, arched, large beak, large eye, and erectile crest. It may be of interest that a specimen taken at "Reventazon" in 1892, is called "pajaro secretario" on the label, probably in reference to the crest. The bird walked and ran well; at rest, it looked about and nodded inquiringly. Out of curiosity or else disturbed by my presence, it rose to a branch and then walked along a log. Also, it hopped with a synchronous lifting of its tail and a low snap of its slightly opened beak.

The second time, I observed a single bird deep inside virgin forest in the wet north-eastern lowlands. This individual was attending a very small species of swarming army ant in company with the usual antbirds. Erecting its crest "excitedly," raising and lowering its tail conspicuously but not regularly, the bird seemed to ignore my presence. At intervals it walked or ran about in search of prey flushed by the ants, usually dispersing the smaller birds as it did so. Scurrying head down in the manner of a chicken, it uttered a low muffled "woof" or "woofwoofwoof," like the wing rustling of a vulture or the hum of a distant motorboat. Also, it perched on twigs and branches just above the ground.

The third time, I met it in the same general locality as the last. Attracted by cracking or snapping sounds, such as those of a snapping manakin but not quite so sharp, I found three birds moving about 8 to 10 feet up in shrubs crawling with army ants. The cracking sounds, made by the beaks of the birds, sounded like strings of firecrackers; also produced were separated staccato snaps. The head, the tail, the wings, or all three jerked with the snaps. Disturbed, the birds dropped to the ground, but soon rose again into the understory.

FAMILY TYTONIDAE

Tyto alba (Scopoli)

BARN OWL

RANGE: Nearly cosmopolitan.

Tyto alba guatemalae (Ridgway)

RANGE: Guatemala to Colombia.

The range of the Barn Owl is possibly country-wide, with the exception of solidly forested regions and the very high altitudes. The species is known mostly from the northern half of the Pacific side of the country, from the dry-forested northwestern lowlands to an elevation of some 5000 feet in the central plateau region. It seems to prefer open and semi-open country, such as agricultural and ranch lands and other deforested areas, for its hunting. It roosts in semi-isolated shade trees, groves, and church towers. It is seen seldom.

I found a single individual at two localities on the Caribbean slope. One was hidden in the foliage of a tall tree in a field near a ranch house at an elevation of about 3000 feet on the eastern slope of Turrialba Volcano. The other was concealed in a leafy tree in a heavily shaded cacao plantation in the lowlands between Siquirres and Puerto Limón. At dusk I have seen several birds issuing from a bell tower in the town of Santa Cruz in the Nicoya Peninsula, and Wetmore (1944, p. 45) "heard or saw barn owls nearly every evening around the church or in the plaza in front of it" during his stay in Liberia, Guanacaste. The only other place I saw it was in the Barranca-Puntarenas district near the Pacific coast, where a single bird, flat-profiled and white-faced, was coursing low over cleared terrain beside a road in the full light of dawn.

FAMILY STRIGIDAE

Otus vermiculatus (Ridgway)

VERMICULATED SCREECH OWL

RANGE: Costa Rica to western Ecuador.

Almost nothing is known about this bird in Costa Rica. Neither Carriker nor I met it, nor, to my knowledge, did Austin Smith collect it. I find it recorded from only six localities. Four are scattered in the northeastern sector, from the Sarapiquí lowlands to the base of the Cordillera Central and upward to the lower montane belt on the same northern slope. The other two are situated, respectively, on the southward-facing slope of Irazú Volcano and in the Candelaria Mountains fringing the central plateau south of

San José. Hence it seems to be primarily a species of the humid Caribbean versant and, as with many other owls, has a broad vertical range from the lowlands into the middle altitudes. Moreover, the paucity of records suggests that it is a forest inhabitant. In the northeastern lowlands, at any rate, it was inside woods that a headless bird, dropped by a forest falcon (*Micrastur*), was recovered by L. R. Holdridge.

Otus cooperi Ridgway

COOPER'S SCREECH OWL

RANGE: Southern Mexico to Costa Rica.

Otus cooperi cooperi Ridgway

RANGE: El Salvador (and Guatemala?) to Costa Rica.

Cooper's Screech Owl, at its southern geographic limit in northwestern Costa Rica, has the distribution of a typical representative of the arid Pacific avifauna of northern Central America and Mexico. Extending southward into the Tropical Dry Forest, it spreads up the deforested slopes of the Guanacaste Cordillera to approximately the upper limit of the tropical belt (= the lower limit of humid forest) and across the subtropical central plateau as far as the city of Cartago or its vicinity. It seems to be not uncommon in the Guanacaste lowlands and west from San José on the central plateau, and I found it common at about 2000 feet at Hacienda Miravalles beside the northwestern divide.

Though its distribution coincides with that of relatively dry, deforested or scrubby country, the bird requires arboreal vegetation, such as streamside groves, thickets, or roadsides lined with small trees. During the day, when it can be seen occasionally, it perches in at least partial concealment below medium heights in medium-sized trees and tall thickets. At night it may descend almost to eye level. It utters a quick nasal "wak" (or "wank"), a short "poo," a nasal "wuf wuf," like a bark of a little dog, and a heavier "wuf" or "ruf."

Otus choliba (Vieillot)

CHOLIBA SCREECH OWL

RANGE: Honduras, Costa Rica to Bolivia and central Argentina.

Otus choliba luctisonus Bangs and Penard

RANGE: Honduras?, Costa Rica to Colombia.

This South American screech owl is known almost exclusively from the central part of the country, where collected almost entirely on the subtropical central plateau and the neighboring slopes. Frantzius (1869, p. 366) said it was to be encountered not uncommonly on the plateau. Cherrie [1892 (1891–1892), vol. 9, p. 327] considered it a "tolerably common resident" in the vicinity of San José. In addition, I found it considerably lower, at 2000 feet near the Río Reventazón, on the Caribbean slope, and close to Lake Arenal at the gap in the northwestern divide. Probably the species will yet be found along the Talamanca Cordillera.

Carriker (1910, p. 475) wrote, "there is no doubt that the common screech owl of Costa Rica is this species," but very little is known about it distributionally or in life. It appears to be an inhabitant of the lower middle altitudes, possibly the length of both slopes. Generalizing my limited experience with it, I would say it occurs singly or in two's, frequents heavily foliated, medium-sized trees, probably tall thickets also, in semi-open situations, such as shaded tree plantations, agricultural lands, and partially deforested country, and is strictly nocturnal. Its humidity requirements, insofar as reflected by the distribution of the bird, are greater than those of *cooperi*. The only call I can definitely assign to it is a slowly bubbling or chuckling one similar to that of *Trogon massena*.

Otus clarkii Kelso and Kelso

BARE-SHANKED SCREECH OWL

RANGE: Costa Rica and western Panama.

This screech owl, the only one of its genus living at very high altitudes in Costa Rica, is known exclusively from the mountainous central part of the country. Although the collecting sites are spread across the plateau region, the bird occurs primarily in the lower montane and montane belts on the Cordillera Central, the mountains bordering the central plateau on the south, the Aguacate Mountains, and the Dota Mountains. Almost certainly it is present, too, the length of the Talamanca Cordillera to Panama. It is not

known from the northwestern divide, from which it may well be absent. Its occurrence at Carrillo, where it was probably collected in the lower subtropical belt on the steep northern slope of the Cordillera Central, is surprising but not entirely unexpected, because the locality lies in a cloud-forested cool pocket. The few times that I found this owl it was at the borders of forest and in hedgerows.

Lophotrix cristata (Daudin)

CRESTED OWL

RANGE: Southern Mexico to Bolivia and the Amazon Valley.

Lophotrix cristata stricklandi

Sclater and Salvin

RANGE: Southern Mexico to western Colombia.

The distribution of the striking Crested Owl is nearly country-wide at the lower elevations, exclusive of the dry-forested northwest and apparently the neighboring continental divide. Most records stem from the central plateau region, including its eastern and western approaches. Though the other known localities are widely dispersed, they embrace most of the tropical belt on the Caribbean slope and in the humid southwest. I suspect that the bird also occurs throughout the subtropical belt and perhaps part of the lower montane belt along both slopes.

The species appears to frequent groves of trees, patches of woodland, tall second growth and subforest, gallery woodland, and heavy forest. I saw it seldom, singly or in two's, at medium heights in trees and jungly vegetation. Though it is undoubtedly a nocturnal species, I once encountered what may have been a mated pair wide awake and "hostile" to my presence in the daytime.

Bubo virginianus (Gmelin)

GREAT HORNED OWL

RANGE: Western Hemisphere.

Bubo virginianus mayensis Nelson

RANGE: Southern Mexico to Veraguas, Panama.

Only one Costa Rican specimen of the Great Horned Owl seems to be known. It was collected a century ago by J. Carmiol at San José and later made the type of *B. v. mesem-*

brinus by Oberholser (1904, p. 179). Carriker (1910, p. 474) wrote: "Evidently a rare bird in Costa Rica, and most likely found only in the higher portions of the country." I did not find it.

Pulsatrix perspicillata (Latham)

SPECTACLED OWL

RANGE: Southern Mexico to Bolivia and northwestern Argentina.

Pulsatrix perspicillata saturata Ridgway

RANGE: Southern Mexico and northern Central America, south on the Pacific slope to Veraguas, Panama.

Pulsatrix perspicillata chapmani Griscom

RANGE: Caribbean slope of southern Central America to western Ecuador.

The northern race, *saturata*, which is supposed to have barred under parts, occurs in Costa Rica only in the northwest. In the American Museum of Natural History a series of skins from Bebedero, at the head of the Gulf of Nicoya, shows much individual variation, from deeply buff, strongly barred under parts to pale buff, unbarred under parts. Southward through Pacific Costa Rica the birds are either unbarred or very weakly barred, but in western Panama (Chiriquí and Veraguas) some specimens again show definite barring. The southern Central American *chapmani*, unbarred, deep buff, almost brownish, below, is said to range northward from Caribbean Panama through eastern Costa Rica into Nicaragua, and perhaps farther. Individuals of this race, however, can be matched by others from western Costa Rica. To complicate matters, Dickey and van Rossem (1938, p. 235) stated that all their Salvadoran specimens, with one exception, have "nearly immaculate (unbarred) underparts," but "all are deeply colored below and are probably best referred to *saturata*." Most of Costa Rica, especially the Pacific slope, seems to be an area of intergradation. At any rate, there is an increasing tendency in southern Central America for the barring to become obsolete or to disappear and for the buff to deepen on unbarred birds.

The Spectacled Owl in Costa Rica is distributed the length of both slopes, mostly in

the tropical belt and to the lower limits of the subtropical belt, "although a few probably straggle up higher" (Carriker, 1910, p. 474). I found it above 4000 feet (at Tapantí). It frequents groves of trees, wooded stands, forest borders, gallery-forested streams, and the periphery of forest both in the dry and very humid life zones. Deeper penetrations of forest seem to follow streams and swamps. Generally it occurs singly or in two's, as a rule not very high in the trees. This powerful species is met far more frequently than any other large owl, especially in the dry-forested northwest, including the Pacific-facing wooded lower slopes of the Guanacaste Cordillera, where I would sometimes see a bird or two perched rather conspicuously beside an open area. In heavily forested regions it spends the day in concealment behind the forest border and enters the neighboring semi-open at night. Occasionally in the daytime I have seen an individual flying from one grove to another when annoyed by mobbing small birds. For an owl, it is encountered often during the day, when I suspect it does some hunting.

The bird makes a deep, rather muffled "hoo" or "woo"; it may be given twice, the second time at a lower pitch. I have heard an immature bird give voice at intervals to a somewhat similar single note that at a distance sounded guan-like and at closer range like a steam-pressured toot. Also uttered are a kind of laughing rattle and an "ooloopoop-poop-poop-poop-poop" similar to a native name of the bird, "olopopo."

***Glaucidium minutissimum* (Wied)**

LEAST PYGMY OWL

RANGE: Mexico to Panama, Guianas, Brazil, and Paraguay.

***Glaucidium minutissimum rarum* Griscom**

RANGE: Costa Rica and Panama.

The species was not found in Costa Rica until 1908, when C. F. Underwood collected it at Bijagua on the Caribbean slope of the Guanacaste Cordillera. Years later, in 1930, Underwood took two individuals at Fuentes, near the continental divide between San José and Cartago. I met it at only two localities, both in the Caribbean lowlands. Inland from Puerto Limón I collected a bird perched

high in a tree in a patch of cutover woodland that bordered a shaded cacao plantation. Near Puerto Viejo in the Sarapiquí region I saw and heard it regularly during the course of a long stay.

This pygmy owl in Costa Rica appears to be primarily if not exclusively an inhabitant of the Caribbean slope, where it occurs mostly in the tropical belt but, as with many other owls, it probably has a considerable altitudinal range. It is fairly common, at least locally in the lowlands, instead of rare as formerly believed. In my experience it inhabits wooded regions, occurring low inside virgin forest at places where the canopy is rather open, like the dense understory of a forested swamp, as well as at woodland borders and in the neighboring semi-open. During the day it may perch exposed on a low bare branch or sit concealed within a thickety border or in the crown, say, of a palm tree. Usually it is seen singly, sometimes in separated two's.

Though I did not see it hunt, the bird is evidently active both day and night. Sitting abroad and looking about in daylight, it may suddenly take off in dipping flight to another stopping place. Tiny, no larger than an ordinary leaf, and stout, with a short, very narrow, stemlike tail, it appears about half as long as a bird of its girth should. On each side of the lower hind neck is a functionally significant blackish patch, usually obscured in skins. Thus, the back of the head precisely resembles the visage of an owl with large, black, staring eyes below buff "eyebrows" (the nuchal collar of museum specimens) surmounted by a typically owl-like forehead peak. This false face is considerably larger and more striking than the real one with its yellowish smaller eyes.

Its note is a "poop," whistled once to 12 times in succession. In repetition it is given at half-second intervals, usually in series of four that sound like a conversational, musical, ventriloquial "poop-poop-poop-poop" similar to that of the antshrike *Cymbilaimus lineatus*. The bird also makes a musical little ripple.

***Glaucidium jardinii* (Bonaparte)**

JARDINE'S PYGMY OWL

RANGE: Costa Rica to Peru and Venezuela.

***Glaucidium jardinii costaricanum* Kelso**

RANGE: Costa Rica and western Panama.

This South American species, here at its northern limit, is the highland representative of its genus in Costa Rica. It is known only from the mountains in the central part of the country, including the volcanoes of the Cordillera Central, the mountains immediately south of Cartago, and the northern end of the Talamanca Cordillera. Undoubtedly it occurs southward in the mountains to Panama; probably it is absent from the northwestern divide. Vertically it ranges from the cloud-forested upper subtropical belt to timber line, with its center of distribution probably in the lower montane and montane belts. In common with most high-altitude birds it cannot be assigned to a particular versant.

"It is a very rare bird in Costa Rica and not often collected, living, as it does, in the dense forests of the mountains, where its small size and sedentary habits render it easily overlooked" (Carriker, 1910, p. 479). This dark little owl seems to be active by day, as are both its Costa Rican congeners. Thus, during one of my two meetings with it in tangled subforest, the bird gave the expected signs of an active hunter. It made sudden dashes through the foliage and branches and came to sudden stops. Perched in an attitude that suggested an imminent departure, it kept looking about eagerly, so to speak, sometimes crouching with its body horizontal and its tail alertly cocked. Its chin, incidentally, appeared to be bearded.

Glaucidium brasilianum* (Gmelin)*FERRUGINOUS PYGMY OWL**

RANGE: Southwestern United States to Strait of Magellan.

***Glaucidium brasilianum ridgwayi* Sharpe**

RANGE: Southern Texas to central Panama.

This is primarily a Pacific species the distribution of which fits the pattern of the arid Pacific avifauna reaching southward to northwestern and central Costa Rica. Fairly common in the southern half of the Tropical Dry Forest, it increases in numbers from the Puntarenas-Barranca district eastward upon the Pacific portion of the central plateau,

from which individuals rise to the lower montane belt on the neighboring slopes. Eastward from San José its numbers decrease markedly, and only an occasional bird can be found down to the lower limit of the subtropical belt on the Caribbean slope of the central highlands. There I met it, once, near Turrialba; a specimen labeled "Carrillo" was taken perhaps at Carrillos on the central plateau. There is no other Caribbean report. Southward from the central plateau and the entrance to the Gulf of Nicoya it remains unrecorded all the way to Panama, where it occurs again on the drier portions of the Pacific slope.

The Ferruginous is the only commonly seen pygmy owl in Costa Rica. An inhabitant of open and semi-open country, it occurs in shrubby pastures, agricultural and ranch lands, coffee fincas, and partially deforested terrain in general. Especially on the drier side of the central plateau, it can fairly often be seen sitting, sometimes on a wire, only a few yards from the ground in open view during the day. Perched, it appears small-headed for an owl, and it frequently raises and lowers its tail.

Speotyto cunicularia* (Molina)*BURROWING OWL**

RANGE: Western North America, peninsular Florida, and locally to Tierra del Fuego; Bahamas and Hispaniola.

***Speotyto cunicularia hypugaea* (Bonaparte)**

RANGE: Western North America to Honduras; winters to western Panama.

The Burrowing Owl, in southern Central America a nonbreeding visitant from the north, has been taken only once in Costa Rica. The specimen (A.M.N.H. No. 485400), a male, was collected December 20, 1900, by C. F. Underwood at Los Cuadros, situated on the deforested southwestern slope of Irazú Volcano facing the central plateau. I thank Eugene Eisenmann for making me aware of the specimen and the record.

Ciccaba virgata* (Cassin)*MOTTLED OWL**

RANGE: Mexico to Paraguay and extreme northeastern Argentina.

***Ciccaba virgata centralis* Griscom**

RANGE: Southern Mexico to western Panama.

Judged by the number of places from which the Mottled Owl has been recorded, it is one of the most common and most widespread owls in the country. Because of its nocturnal habits, however, it is not met often. It is distributed along most of the length of both slopes, from the lowlands to subtropical elevations and, in places, upward into the lower montane belt. Both in the relatively dry Pacific northwest and on the largely deforested central plateau it occurs at gallery-forested streamsides and in groves; in the wetter life zones, in patches of woodland and even in the interior of virgin forest, as at a wooded swamp or in thickets beside a forest stream. It keeps concealed during the day within tangles of vines, thickety growth, and bushy small trees. It utters a rather long, sharp whistle that ends with a rising metallic "wst" of shrieking quality, a call of several whistled notes that bring to mind an antbird such as *Formicarius analis*, a set of three muffled grunts successively decreasing in strength, and probably other cries.

Ciccaba nigrolineata* Sclater*BLACK-AND-WHITE OWL**

RANGE: Southern Mexico to western Ecuador and western Venezuela.

Carriker's (1910, p. 478) statement that the Black-and-white Owl is "evidently a very rare bird in Costa Rica" still holds. It is known from only five localities: Bebedero, at the head of the Gulf of Nicoya; Chomes, on the mainland shore of the Gulf of Nicoya; Los Anonos, at the Río Virilla not far from Escazú, near the southern edge of the central plateau; Tarrazú, in the subtropical Dota Region; and El Hogar, at the base of Turrialba Volcano, in the northeastern lowlands. One of the birds from Guanacaste (Chomes) was collected in a mangrove swamp. Carriker (*loc. cit.*) wrote: "The single male which I secured at El Hogar was found in the thick forest, hidden away in a clump of vines in a low tree." I did not meet it.

The known Costa Rican range includes the wet-forested northeast, the central plateau region, and part of the dry-forested Pacific northwest. The unknown range probably in-

cludes most of the Caribbean slope and possibly the humid-forested southern half of the Pacific slope. Perhaps its distribution parallels that of the abundant congeneric *virgata*, which frequents suitable habitat both in humid tall forest and wooded patches or borders in relatively dry Guanacaste.

Rhinoptynx clamator* (Vieillot)*STRIPED OWL**

RANGE: Southern Mexico to Bolivia and east-central Argentina.

***Rhinoptynx clamator clamator* (Vieillot)**

RANGE: Southern Mexico to Peru, Bolivia, and southern Brazil.

The Striped Owl is known thus far from eight localities, all on the Pacific slope, from the Guanacaste Cordillera (Miravalles, altitude 1500 feet) southward through the dry-forested northwest (Nicoya Peninsula; Puntarenas) and the central plateau (vicinity of San José) to the far southwest (upper and lower portions of the Térraba drainage). Its center of distribution is undoubtedly the Térraba region. Though known mostly from tropical-belt elevations, it follows suitable habitat into the lower subtropical belt.

The species, in common with most owls in the country, is met very seldom, even though it prefers relatively open areas, such as grassy and bushy clearings and a savanna type of country in general. Like the Short-eared Owl, for example, it is apt to occur on the ground, concealed in low cover. I happened upon it only twice, both times during the day. The first time it flushed from the ground to a bushy tree in a thickety border; the second time, I spied one flying into scrub. Specimens show a good deal of individual variation. Hence I am unable to assign Central American birds to *forbesi*, as did Lowery and Dalquest (1951, p. 576).

Asio flammeus* (Pontoppidan)*SHORT-EARED OWL**

RANGE: Eurasia and Western Hemisphere.

***Asio flammeus flammeus* (Pontoppidan)**

RANGE: Breeds in Eurasia and North America; in New World winters south to Central America.

The Short-eared Owl is a rare or accidental

winter visitant to Costa Rica. I know of only two specimens. The first (U.S.N.M. No. 39735), a female, was collected December 18, 1863, by Frantzius at or near San José. The second (M.N.C.R. No. 20119), a female, was taken at Rincón de Cubillos, also in the general vicinity of San José, by an unspecified collector on December 12, 1916.

***Aegolius ridgwayi* (Alfaro)**

ALFARO'S OWL

RANGE: Southern Mexico to Costa Rica.

***Aegolius ridgwayi ridgwayi* (Alfaro)**

RANGE: Costa Rica.

This Central American owl has been recorded in Costa Rica from only three places in the central highlands: Irazú Volcano, Candelaria Mountains, and the Dota Mountains. It seems to be primarily an inhabitant of the lower montane belt and also occurs in the montane belt, probably upward to timber line. Though not recorded from the main Talamanca Cordillera, the bird probably ranges along the mountains southward to Panama. Its known distribution makes it sympatric with the smaller *Glaucidium jardi-nii* and the larger *Otus clarkii* under the same high-altitude, cloud-forested conditions. I know nothing about it in life, yet suspect it does not occur inside heavy woodland. (See Marshall, 1943, pp. 24-27, who observed the species in El Salvador.)

FAMILY NYCTIBIIDAE

***Nyctibius griseus* (Gmelin)**

COMMON POTOO

RANGE: Southern Mexico to Bolivia and northern Argentina; Hispaniola and Jamaica.

***Nyctibius griseus costaricensis* Ridgway**

RANGE: Nicaragua to extreme western Panama.

The uncommon Common Potoo is known from only seven localities. "It seems to be distributed over the whole of the country, specimens having been taken on the Caribbean lowlands (Guápiles), the central plateau (Sarchí de Alajuela), and the southwestern Pacific lowlands (El General de Térraba) [above the lowlands]" (Carriker, 1910, p. 500). It has since been found by Austin Smith in the Tropical Dry Forest (Tempate) and

by me in the upper Térraba Valley in the southwest (Buenos Aires) and in the north-eastern lowlands (near Puerto Viejo de Sarapiquí). In addition, there is in the Museo Nacional de Costa Rica an unrecorded specimen from the plateau region (Sabanilla de Alajuela). Probably this nocturnal species is not so uncommon as indicated, at least in the southwestern savannas where some people know the bird well. I suspect the preferred habitat lies in and beside semi-open areas and tree-scattered clearings the length of both slopes, perhaps mostly in the tropical belt but also upward to the subtropical central plateau, rather than inside forest.

I observed the bird in the daytime near Puerto Viejo. It was about 50 feet up in a thin-foliaged, leguminous tree overlooking a small marsh a little behind the forest border. Absolutely motionless, it was perched on a branch crosswise in the usual manner, say, of an owl, but with its erect body tilted a few degrees sideways from the perpendicular, its head and beak pointing straight up, and its feet invisible. Its body was crossed by the perch at the middle of its total length. The bird at Buenos Aires was in a scrubby wood lot near the edge of town, where the mayor pointed it out to me. It was perched only 10 feet up in the usual potoo manner, that is, on the tip of a stub, its head and beak pointing straight up. I could hardly tell where the camouflaged bird began and the stub ended. I collected this specimen (later lost); its stomach was filled with the hard parts of small beetles.

Two similar calls which I assign to this species are an arresting loud "wow, oo·wów, oo·wów," with the quality of the cry of a guan or a Laughing Falcon (*Herpetotheres*), and a sort of childlike "ugh, gwówer," dropping at the end, with the same sort of quality. Both calls are repeated a few times in successively falling cadence. I heard the bird mostly on moonlit nights.

FAMILY CAPRIMULGIDAE

***Chordeiles acutipennis* (Hermann)**

LESSER NIGHTHAWK

RANGE: Southwestern United States to Venezuela, northern Chile, and southeastern Brazil.

***Chordeiles acutipennis texensis* Lawrence**

RANGE: Breeds from southwestern United States through northern two-thirds of Mexico; winters southward to western Colombia.

***Chordeiles acutipennis inferior* Oberholser**

RANGE: Breeds in Baja California and adjacent coastal Sonora, and from Yucatan to Nicaragua; northern birds winter southward to Panama Canal Zone.

***Chordeiles acutipennis acutipennis* (Hermann)**

RANGE: Pacific slope of Central America southward from southwestern Nicaragua, and greater part of South America.

The Lesser Nighthawk in Costa Rica, as represented by specimens, consists mostly of migratory forms that breed farther north. As their taxonomic status is still not clear, I follow an alternative suggested by Eisenmann (1962a, p. 17) and provisionally unite *C. a. micromeris* Oberholser and *C. a. littoralis* Brodkorb with *inferior*. Both transients and visitants have been found almost exclusively on the Pacific slope, from sea level to the central plateau; the species has rarely been recorded from the Caribbean slope (Limón and Turrialba).

Personally, I found wintering birds only in the Tempisque basin, usually perched along the edges of wooded stands that border boggy pastures and not flying beyond the grove when disturbed. A favored migration route is the Pacific littoral. There, in September, I have seen streams of birds pass at nightfall, flapping in a lackadaisical way and often holding the wings in a V above the back. In the morning individuals could be kicked up from the low scrub and grass behind the beach. Flying a short distance and re-settling on the ground, they appeared camouflaged mothlike or scale-patterned like a snake skin.

Eisenmann (1962a) has presented evidence for the existence of a southern Central American population which, in Costa Rica, is to be found at the base and probably along the lower slopes of the Guanacaste Cordillera in the Pacific northwest. It is very similar to nominate *acutipennis*, probably breeds in Costa Rica, and may migrate to South America. I suspect the presence of this form in the southwestern savannas, if only because

of a single encounter with a trilling bird in flight one evening in May.

Chordeiles minor* (Forster)*COMMON NIGHTHAWK**

RANGE: Breeds in North and Middle America; winters largely in South America from Colombia to Patagonia.

***Chordeiles minor minor* (Forster)**

RANGE: Breeds in northern and northeastern North America; migrates through Middle America; winters in South America.

[*Chordeiles minor hesperis* Grinnell

RANGE: Breeds from southwestern Canada to California and Utah; migrates through Mexico and Central America; winters presumably in South America; no Costa Rican record.]

[*Chordeiles minor sennetti* Coues

RANGE: Breeds in northern west-central United States and adjacent Canada; winters in South America; recorded on migration in eastern Panama; no Costa Rican record.]

[*Chordeiles minor howelli* Oberholser

RANGE: Breeds in southern west-central United States; found on migration in Mexico and Central America; winters presumably in South America; no Costa Rican record.]

[*Chordeiles minor henryi* Cassin

RANGE: Breeds from southwestern United States to north-central Mexico; found on migration in Mexico and Central America; apparently winters in South America; no Costa Rican record.]

***Chordeiles minor aserriensis* Cherrie**

RANGE: Breeds from southern Texas to Tamaulipas; reported on migration from Mexico and Costa Rica; winters apparently in South America.

[*Chordeiles minor chapmani* Coues

RANGE: Breeds in southeastern United States; recorded on migration from southern Mexico and Central America; winters in South America; no definite Costa Rican record.]

***Chordeiles minor panamensis* Eisenmann**

RANGE: Pacific slope, northwestern Costa Rica and Panama from western Chiriquí to eastern Panama Province.

The Costa Rican status of the Common Nighthawk is similar to that of the preceding species, except that it is not known to winter here. It is this species that I assume to be the one which is regularly seen in transience, mostly along the lower Caribbean slope, in the spring and fall. A southern Central American race, *panamensis*, recently described by Eisenmann (1962a, p. 4), almost certainly breeds in Guanacaste and is perhaps resident on the approaches to and lower slopes of the continental divide and possibly elsewhere in suitable habitat on the Pacific side of the country. Migrating individuals pass over silently, usually in strung-out groups or in separated two's and three's, mostly in April and September. This species keeps much higher in the air than the Lesser Nighthawk, and it may spread its tail and hang in the air momentarily between the flagella-like whipping beats of its wings. Occasionally in mid-May on the southwestern savannas I saw lone nighthawks flying and "zeeping," and people living there claimed to have heard the bird boom over the airport at Buenos Aires.

Nyctidromus albicollis* (Gmelin)*PAURAUQUE**

RANGE: Southern Texas to Bolivia and northeastern Argentina.

***Nyctidromus albicollis intercedens* Griscom**

RANGE: Southern Mexico to northern Colombia.

The common nightjar of Costa Rica, the Pauraque, is abundant and widespread the length of both slopes from the lowlands into the subtropical belt and "up to 9,000 and even 10,000 feet on the Volcanoes de Irazú and Turrialba" according to Carriker (1910, p. 502), who "found it breeding on the Volcano de Irazú at nearly 9,000 feet, a nest and eggs being taken there April 13, 1902."

This is the crepuscular and nocturnal bird the pink-glowing eyes and white-flashing wings of which reflect automobile headlights even on relatively well-traveled roads. Dur-

ing the day it rests amid ground cover in plantations and bushy clearings, in thickets, along overgrown woodland borders, and, in heavily forested regions, at openings made by man. Flushed, it flits lightly as a moth and lands perhaps a few yards distant, camouflaged to the vanishing point. At nightfall it enters bare or short-grassed openings, including roads and roadsides, and sits on the ground or on logs and stones. A number of individuals may be stationed about, and they flit for low-flying insects.

Should the bird be nesting, it performs a distraction display which I have noted only in the brightly white-patterned males. If incubating, the male flits as though injured and flaps helplessly on the ground. If brooding, it crawls as though hugging the ground on half-bent legs and half-opened, flipper-like wings, flops about with spread wings, and makes a froglike gargle, all to draw attention to itself. The baby birds sit immobilized even when touched and do not occur in the same spot on successive days.

The bird calls mostly in the evening and before dawn. It could easily be considered a noisy pest during the breeding season. Its Costa Rican name, "cuyejo," is an onomatopoeic rendition. A stuttering series of notes often introduces or builds up to the cry.

Caprimulgus carolinensis* Gmelin*CHUCK-WILL'S-WIDOW**

RANGE: Breeds in southeastern United States; winters south to Colombia and in Bahamas and Greater Antilles; recorded in Venezuela.

Chuck-will's-widow is an uncommon to rarely seen passage migrant and a very local visitant from October to April. It is known from scattered localities most of the length of both slopes, primarily in the tropical belt but also higher along the northwestern divide and over the central plateau region. In winter it seems to be regular and fairly common only in the vicinity of the Gulf of Nicoya and is present on the central plateau. Elsewhere the dates of collection or observation coincide with the periods of migration. My experience with it is mostly limited to finding single individuals in scrubby patches of dry forest, at tree-lined boundaries in agricultural lands, in tall mangroves, and, in migration, in tangled

riverside growth (in the humid northeast). Almost always I found it perched in nighthawk fashion along branches of low trees or fairly low in medium-sized trees, rarely on the ground. Every so often I would flush a bird I assumed to be this one in tall humid forest. Disturbed birds uttered at most an even, low "chuck."

***Caprimulgus rufus* Boddaert**

RUFous NIGHTJAR

RANGE: Costa Rica to the Guianas, Brazil, and northern Argentina; St. Lucia (Lesser Antilles) and Trinidad.

Caprimulgus rufus minimus

Griscom and Greenway

RANGE: Costa Rica to Venezuela.

Griscom wrote (1927, p. 4): "There are very few records for this species in Panama. These, however, indicate clearly that it is not a forest species." The only Costa Rican specimen (A.M.N.H. No. 389422) was collected July 9, 1921, by Austin Paul Smith at Atalanta in the Estrella Valley of the southeastern Caribbean lowlands. This is also the northernmost report for the species on the mainland. I thank Mr. Eugene Eisenmann for bringing it to my attention.

***Caprimulgus vociferus* Wilson**

WHIP-POOR-WILL

RANGE: Breeds from eastern North America and southwestern United States to Honduras and El Salvador; winters from southern Texas and southeastern United States to Costa Rica and Cuba.

***Caprimulgus vociferus vociferus* Wilson**

RANGE: Breeds in eastern North America; winters from southern Texas and southeastern United States to Costa Rica and Cuba.

Though listed by Zeledón (1887, p. 120), the first Costa Rican record of this migratory species seems to be that of George K. Cherrie, who collected a bird in February, 1889, near San José. I know of only three other specimens, all taken by Austin Smith, from Nicoya, Puntarenas, and El Pozo del Río Térraba. The collecting dates, extending from November 30 to February 24, prove the Whip-poor-will a winter visitant. As noted by Carriker (1910, p. 505), it appears

to be a straggler so far south. It is, of course, a nocturnal species that could easily be missed if silent. Known thus far only from the Pacific slope, it will almost surely be found on the Caribbean side, too.

***Caprimulgus saturatus* (Salvin)**

DUSKY NIGHTJAR

RANGE: Costa Rica and western Panama.

The native Dusky Nightjar inhabits the high altitudes, from the lower montane belt through the montane belt to somewhat above timber line. It is known thus far only from the central highlands, including the Cordillera Central, the mountains along the southern edge of the central plateau, and the Dota Mountains. Its distribution undoubtedly follows the Talamanca Range to Panama, where it has been recorded from Chiriquí Volcano. It is probably absent from the northwestern divide. It seems to be a non-forest species that enters clearings, openings, and park-like pastures at night and rests in thickets and along woodland borders during the day. I found it common at the start of the breeding season in February at 10,000 feet on Turrialba Volcano, when birds were calling repeatedly at night.

This montane whip-poor-will is sympatric ecologically and geographically with the wide-ranging Pauraque (*Nyctidromus albi-collis*). Whereas the Dusky Nightjar is restricted to the upper parts of the mountains, the vertically overlapping Pauraque is much more abundant at the lower elevations. The Dusky perches on and forages from branches several yards above the ground. The Pauraque is virtually semiterrestrial. Moreover, the Dusky is in breeding condition in February and March; the Pauraque, in April and May. The call of the Dusky is an unmistakable "whip-poor-will" with an introductory "chick" or "chip."

***Caprimulgus cayennensis* Gmelin**

WHITE-TAILED NIGHTJAR

RANGE: Costa Rica to Colombia and northern Brazil; Martinique and islands off coast of Venezuela.

***Caprimulgus cayennensis albicauda* (Lawrence)**

RANGE: Costa Rica to Colombia.

Though recorded a number of times, the

species is rare or seldom encountered in Costa Rica, at the northern limit of its range. The collecting sites are sprinkled over much of the country on both slopes, from the lowlands well into the subtropical belt, exclusive of the far southwest where it undoubtedly occurs. Despite a record from Bebedero in the Tropical Dry Forest, this species appears to be associated with humid woodland, perhaps including heavy forest, rather than scrubby or deforested country such as extends from Guanacaste to the central plateau. Its known altitudinal range makes it largely allopatric with the congeneric Dusky Nightjar. It is completely sympatric with the abundant Pauraque, from which it perhaps differs ecologically and in habits as does the Dusky.

FAMILY APODIDAE

Streptoprocne zonaris (Shaw)

WHITE-COLLARED SWIFT

RANGE: Southern Mexico to Bolivia and Argentina; Greater Antilles.

Streptoprocne zonaris albicincta (Cabanis)

RANGE: Honduras to Peru and Mato Grosso.

The striking, large White-collared Swift is met over the entire country from the seashores to the mountain tops, a distance that it could easily cover in its daily foraging. It usually occurs in flocks that range in size from several to a hundred or so individuals, extraordinarily to a few hundred. A very large flock may mill about, wheeling confusingly in clockwise and counterclockwise paths, meanwhile rising higher in the sky in order to reassemble and sail in formation out of sight, as does a swarm of migrating hawks. Sometimes I wondered whether the species does not indeed migrate.

The birds are seen, of course, only in the air, often in changeable silhouette. Any individual at different times has its tail appear notched, truncate, or slightly rounded, its wings narrow and bowed in swift flight or proximally broadened through flexing of the secondaries when soaring. An occasional lone bird brings to mind the Bat Falcon (*Falco albigularis*), which it resembles in the white-collared black plumage and long, narrow, pointed wings with a 16-inch spread that

approaches that of the falcon. Its fluttering beats, too, approximate the short-arc'd ones of the rushing falcon, and the two species may appear similar when sailing.

I have transcribed its call as a "whiss whiss," a "squiss" or "squees," a scratchy "tseet tseet" (or "zirt"), and an abrupt harsh squeal. When unexpectedly all the members of a flock break out at once, the notes then sound like a repeated "s·ree s·ree s·ree," and so on, or, at close range, a parrot-like, thin screech.

Chaetura pelagica (Linnaeus)

CHIMNEY SWIFT

RANGE: Breeds in eastern North America; winters in upper Amazonia.

The presence of this swift in transience through Costa Rica was proved by Austin Paul Smith. He collected it October 27 and 28, 1927, at an elevation of 3500 feet, above Peralta (at the southeastern base of Turrialba Volcano), and again October 24, 1933, somewhere above 2100 feet near Villa Quesada (on the northwestern approach to Poás Volcano). The latter individual was shot out of a flock of 50 swifts, which may or may not all have been this species (Smith, 1934). Apparently all Smith's specimens are males. Also on the Caribbean slope at the time of the fall migration, I noted in the northeastern and southeastern lowlands an occasional, plain-colored, lone swift, which I thought might be this species, in the company of migrating swallows. Probably the bird passes through the country on its return in the spring.

Chaetura vauxi (Townsend)

VAUX'S SWIFT

RANGE: Western North America to Panama; northern Venezuela.

Chaetura vauxi richmondi Ridgway

RANGE: Southern Mexico to Panama.

Vaux's Swift seems to be primarily an inhabitant of the subtropical foothills and slopes on both sides of the country. It is known from the northwestern divide (Miravalles), the Caribbean versant of the central highlands from the upper tropical belt to the lower lower-montane belt, at similar elevations in the Dota region and at the northern

end of the Talamanca Cordillera, and the lower slope of the Talamanca Cordillera in the southwest. There is a record from the Nicoya Peninsula, none from the rest of the Tropical Dry Forest, the central plateau, or the lower Caribbean slope, in all of which regions it undoubtedly occurs seasonally or as a regular if not daily visitor. At any rate, I have frequently seen apparently unpatterned small *Chaetura* swifts in places from which there are no specimens, including daily flocks over San José. I suspect, moreover, it is the only *Chaetura* in all the northern half of the Pacific side of the country.

The bird is seen as a rule in flocks or smaller bands, generally not very high in the air, frequently at canopy height or lower, coursing through swarms of flying insects too small to be seen from a distance by the unaided human eye. The flocks presumably cover a wide range and in any area come and go daily or at irregular intervals. It occurs in pure bands and also with other swifts, especially *Streptoprocne zonaris* and probably the congeneric *cinereiventris* on the Caribbean side or *spinicauda* in the southwest. It utters measured "sit" 's, mixed with sibilant notes, as well as buzzy sounds.

***Chaetura cinereiventris* Sclater**

GRAY-RUMPED SWIFT

RANGE: Nicaragua to Bolivia and southeastern Brazil; Grenada.

***Chaetura cinereiventris phaeopygos* Hellmayr**

RANGE: Nicaragua to northwestern Panama.

The Gray-rumped Swift is restricted largely to the tropical belt the length of the Caribbean slope, ranging abundantly in the lowlands and low foothills and, in fewer numbers or perhaps only seasonally, in the lower subtropical belt. Hence its distribution at the lower elevations complements that of the largely subtropical *vauxi*. Easy to identify under good viewing conditions, it can be found daily in the lowlands where *vauxi*, which is hard to identify, seems to be quite uncommon. When the two species forage as a mixed flock, the gray-rumped, dark-bellied *cinereiventris* catches the observer's eye, whereas *vauxi*, because of its negative characters, is usually passed over uncertainly.

This swift occurs as a rule in flocks or small groups. Even in heavily forested regions it is a daily visitant over clearings and semi-open country. The members often mill about in a particular site at which a concentration of tiny winged insects is swarming about the outer foliage of fruiting or flowering trees. Flocks also sweep low along rivers, sometimes almost like surface-skimming Mangrove Swallows (*Iridoprocne albilinea*) or higher-flying Rough-winged Swallows (*Stelgidopteryx ruficollis*). The birds utter soft rippling twitters.

***Chaetura spinicauda* (Temminck)**

BAND-RUMPED SWIFT

RANGE: Costa Rica to Colombia and northern Brazil.

***Chaetura spinicauda fumosa* Salvin**

RANGE: Costa Rica to Colombia.

The Costa Rican distribution of this swift has hardly changed since Carriker wrote (1910, p. 508): "The present species is found only in the lowlands of the Pacific, and thus far has been taken only at Pozo Azul de Pirris and in the upper Térraba Valley." It has been recorded also from the General region, and I met it at an additional three localities: Boruca, in the Térraba Valley, where small groups were present from time to time; the lower Coto Brus Valley, where it was abundant; Rincón de Osa, at the head of the Golfo Dulce, where it was extraordinarily abundant.

The Band-rumped, the Pacific counterpart of the Caribbean *cinereiventris*, is nearly confined to the humid tropical belt along the southern half of the Pacific slope, with its center of abundance in the General-Térraba-Golfo Dulce sector. Vertically its range apparently complements in large part that of the higher-altitude *vauxi*. It occurs in small groups, in two's and three's, and singly at all heights down to the level of shrubs. A noisy bird, it makes squeaking, "squicking," and twittering sounds.

***Cypseloides rutilus* (Vieillot)**

CHESTNUT-COLLARED SWIFT

RANGE: Western Mexico to Bolivia and the Guianas.

***Cypseloides rutilus brunnitorques* (Lafresnaye)**

RANGE: Southern Mexico to Peru.

Carriker wrote (1910, p. 509): "Rather an abundant bird over the greater portion of Costa Rica, but especially on the Caribbean slope and central plateau region. I saw one flock in the Térraba Valley. . . . Underwood also took it farther up the Rio General de Térraba." Cherrie noted [1892 (1891-1892), vol. 9, p. 324]: "Resident about San José, but not common." Elsewhere it has been recorded from northern Guanacaste (El Pelón de la Altura), and I observed it at Rincón de la Vieja Volcano. Though most records stem from the region of the central highlands, where most of the collecting has been done, they probably do indicate the real center of abundance. In my experience the species can be seen occasionally on the mountain slopes, upward into the lower montane belt, that overlook the central plateau, also the subtropical slopes and foothills down to 2000 feet of the Caribbean side of the Cordillera Central and in the Reventazón Valley. It occurs in small flocks, as a rule quite high in the air, usually with other swifts. The only note that I can assign it is a scratchy, guttural "dzit."

***Cypseloides cherriei* Ridgway**

CHERRIE'S SWIFT

RANGE: Costa Rica, Colombia, western Venezuela.

Cherrie's Swift in Costa Rica is represented by only two specimens, one taken somewhere on Irazú Volcano, the other at an unspecified locality. Though little known, it is almost surely more abundant and widespread than indicated. From time to time in mountainous parts of the country I have seen black swifts which I could not identify and which could belong to this, the preceding, or the following two species of the genus. Cherrie's seems to be a montane inhabitant throughout its known range.

***Cypseloides cryptus* Zimmer**

WHITE-CHINNED SWIFT

RANGE: British Honduras and Honduras to Peru and British Guiana.

The species is known in Costa Rica from one specimen (A.M.N.H. No. 477466). This bird, a female, was taken June 10, 1910, by

C. F. Underwood at San Pedro on the outskirts of San José. Zimmer in his original description (1945, p. 588) wrote that "the range of *C. cryptus* is probably extensive through the mountains of western and northern South America." It may not, however, be a montane species in Central America, where it has been taken in the lowlands more often than in the highlands and where even its status, whether a resident or a visitant from South America, remains uncertain. "Seven of the eight known specimens of *cryptus* from Middle America (British Honduras to Panamá) were collected in June, July, or August; the eighth was taken in late March in Panamá" (Eisenmann and Lehmann, 1962, p. 9).

***Cypseloides niger* (Gmelin)**

BLACK SWIFT

RANGE: Western North America to Costa Rica; West Indies; recorded in British Guiana.

***Cypseloides niger costaricensis* Ridgway**

RANGE: Southern Mexico to Costa Rica.

The status in Costa Rica of the Black Swift, supposedly at its southernmost mainland limit, is poorly known. The few specimens have come from only two areas: the vicinity of San José on the subtropical central plateau, and lower and upper tropical-belt elevations in the Térraba region of the southwest. In view of the fact that they all date from May and June, and that a male (M.N.C.R. No. 1610), taken May 24, 1887, by Zeledón, has the notation "breeding" on the label, one might conclude that Costa Rican birds are breeding summer visitants. Yet this would be the sort of situation expected in birds arriving from South America.

Austin Smith (1932) reported hundreds of black swifts of this species in the company of many Barn Swallows moving northward along the beach at Punta Uvita, on the southwestern Pacific coast, on May 15 and 16. In early May, 1962, at Dominical, only a few miles from Punta Uvita, I also saw an unusual concentration of *Cypseloides* swifts, which I identified tentatively as the Black because of their notched tails. These observations suggest that the continental range of the species extends southward beyond Costa Rica.

[Panyptila cayennensis (Gmelin)]

LESSER SWALLOW-TAILED SWIFT

RANGE: Southern Mexico; Honduras to Ecuador and southern Brazil.

This swift was not listed for the country by Zeledón (1887) or by Carriker (1910). Ridgway [1911 (1901–1950), pt. 5, p. 691] included eastern Costa Rica in the range, but added the footnote: "The species has not yet been recorded from Costa Rica, however, so far as I am aware." Peters [1940 (1931–1962), vol. 4, p. 254] had it ranging, in Central America, from southeastern Nicaragua to the Canal Zone, thus implying actual or supposed occurrence in Costa Rica. Yet I know of no Costa Rican specimen or published sight report other than my own for the north-eastern lowlands, where I observed it throughout the year (Slud, 1960, p. 95). Elsewhere on the Caribbean slope I saw it, occasionally, only near the town of Turrialba (altitude 2000 feet). In addition, I found it at two places in the Pacific southwest: the lower Coto Brus Valley in the Térraba region, and near Rincón at the head of the Golfo Dulce. It is highly unlikely that Costa Rican birds do not belong to nominate *cayennensis* distributed from Honduras far southward in South America.

In Costa Rica this bird is the famous "macuá," the tunnel-like nest of which is sought universally and bought piecemeal at exorbitant prices for its supposed magical qualities. The only nest that I saw was constructed of fine fibers without interwoven feathers and resembled a mass of reddish blond animal hair. Opened it suggested a womb.

The species occurs over semi-open and heavily forested areas, almost always high above the tops of the trees. Usually it is seen singly or in two's, occasionally in groups of four to six individuals aloft at the same time. It may or may not accompany bands of other swifts (*Chaetura*). It seems to be resident the year round at a particular locality, but its hunting range probably covers many square miles. The tail normally appears pointed rather than forked, but becomes fan-shaped when widely spread.]

FAMILY TROCHILIDAE

Doryfera ludovicae (Bourcier and Mulsant)

GREEN-FRONTED LANCEBILL

RANGE: Costa Rica to Bolivia and Venezuela.

Doryfera ludovicae veraguensis Salvin

RANGE: Costa Rica and western Panama. Carriker wrote in 1910 (pp. 517–518): "This is rather a rare bird in Costa Rica and seems to be confined entirely to the higher parts of the Caribbean water-shed, at an altitude of from 3,000 to 5,000 feet. The specimens taken were shot among shrubbery on the edges of the forest, where they were feeding on flowers. Its true habitat is, however, in the forest." The species is still known only from the Caribbean versant of the central highlands, mostly on the slopes of the Cordillera Central.

Its center of distribution is probably at the altitudes given by Carriker, approximately the upper half of the subtropical and lower portion of the lower montane belts, but the bird also ranges to at least 8000 feet or the lower limits of the montane belt. It has not been recorded from the northwestern divide, from which it is probably absent, or the Talamanca Cordillera, along which it is almost surely present. Apparently it frequents natural breaks and man-made openings, including roadsides, in mountainous, wet terrain. In such places, where light enters freely, it may visit flowering shrubs at edges of one sort or another.

Glaucis hirsuta (Gmelin)

HAIRY HERMIT

RANGE: Nicaragua to Bolivia and Brazil; Grenada.

Glaucis hirsuta aenea Lawrence

RANGE: Nicaragua to western Panama; western Colombia to northwestern Ecuador.

The so-called Hairy Hermit is distributed over the humid lowlands on both slopes. My observations agree with those of Carriker (1910, p. 519), who stated that the bird, though ranging widely, occurs "in small numbers, never being abundant, as are the other species with which it associates [*Threnetes*

ruckeri, *Phaethornis superciliosus*, *Amazilia amabilis*]. I do not believe it is found above 1,000 feet. Its habits are the same as those of [*Threnetes ruckeri*]." The species is not known from the entire northwestern sector of Costa Rica—neither the Caribbean and Pacific portions nor the continental divide. Nor, anywhere in the country, does it appear to range higher than the lower foothills well within the tropical belt. A record from San José [Ridgway, 1911 (1901–1950), pt. 5, p. 335] is so exceptional that it may be an error.

Here in Costa Rica it is completely sympatric with *Threnetes ruckeri*, to which it bears a remarkable superficial resemblance. The two are virtually identical in size and bodily proportions, style of coloration, wedge-shaped tail, and long curved bill, though each possesses distinguishing field marks. *Glaucis* is relatively uncommon, sometimes rare, in apparently suitable habitat; *Threnetes* is usually relatively abundant. Their preferred habitats overlap considerably, and the two are often found foraging at the same site. Though both occur in wooded and even heavily forested regions, *Glaucis* inhabits the immediate vicinity of woodland, including overgrown forest borders, thickety or vine-tangled second growth, shrubbery, leafy and grassy streamsides, even mangroves, but it hardly penetrates the forest. It is seen singly, low above the ground, frequenting plantain thickets and other flower-bearing, usually partly shaded, ground cover. *Threnetes* is only a visitor at the habitats favored by *Glaucis*.

***Threnetes ruckeri* (Bourcier)**

RUCKER'S HERMIT

RANGE: Honduras to western Ecuador and western Venezuela.

***Threnetes ruckeri ventosus* Bangs and Penard**

RANGE: Honduras to central Panama.

The distribution of Rucker's Hermit closely parallels that of the preceding species, except it extends to the lower limits of the subtropical belt and overlaps the southern part of the Tropical Dry Forest to slightly beyond the Río Grande de Tácoles. Like *Glaucis*, it has not been recorded from virtually all of the northwestern quadrant nor does it range upward to the plateau region,

where so many hummingbirds have been collected seemingly out of range.

Rather a common bird in Costa Rica, relatively abundant compared to the very similar *Glaucis*, it is not nearly so numerous as the two species of *Phaethornis* (*superciliosus* and *longuemareus*) with which it also occurs and which it generally resembles. In my opinion Rucker's is primarily a woodland species; in fact, it is one of the few hummingbirds encountered regularly well inside tall virgin forest. It is also seen frequently along borders of woodland and in nearby *Heliconia* thickets, the same sorts of situations in which to expect *Glaucis* and the two *Phaethornis* mentioned above. Outside the forest as well as inside, it generally keeps from a couple of feet above the ground to a little higher than eye level. It is almost always seen singly, but several individuals may be scattered over a favorable site. It is one of several hummingbirds apt to hover close to the observer, sometimes only inches away, continually pumping its tail, then suddenly it dashes away to the accompaniment of its sharp "ss ss." Also when perched, generally in concealment in the foliage understory, it pumps its tail and rather resembles *Phaethornis superciliosus*.

The "ss" can also sound like "siss" or "sn" and may be repeated two or three times by perched birds as a recognizable "call." The species also has a "song" at least as good as that of its neighbor, the Caribbean form of the finch *Arremon aurantirostris*, to which it is very similar in quality, pattern, and timing. It consists of several lazy "squeechy" notes expressed piercingly thin and high, as through a tiny orifice. The bird also makes a rippling, snorting twitter mixed with "ss" 's.

***Phaethornis guy* (Lesson)**

GREEN HERMIT

RANGE: Costa Rica to Peru and Venezuela; Trinidad.

***Phaethornis guy coruscus* Bangs**

RANGE: Costa Rica to northwestern Colombia.

The center of distribution of the Green Hermit follows the upper two-thirds of the very humid portions of the subtropical belt the length of the country along both slopes,

and the bird is most abundant in the region of the central highlands, especially the Caribbean versant. It seldom ranges below the upper limits of the tropical belt, though an occasional bird reaches the lowlands, particularly in the southwest, nor does it rise above the lower montane belt. It overlaps the congeneric lowland *superciliosus* upward from the upper tropical belt and begins to replace it at about 2500 feet. Like *superciliosus*, it is a woodland species that prefers shaded undergrowth; unlike *superciliosus*, it is largely confined to gloomy forest. A restless, quickly dashing bird, usually seen alone, it visits nearby openings briefly.

The sexes of this darkly brilliant bird can be hard to distinguish. The under parts of the female do not shine, but hardly do those of the male in the dark forest. Though the tail of the female is much longer, that of the male is long also. The lower mandibles are differently colored, but, as the black bill of the female is brightly colored inside, held slightly open it resembles the bill of the male. The buff jaw streak of the female is perhaps the best field mark, provided it is not confused with the buff streak down the throat of the male.

Aside from a sharp squeak the bird gives when shooting past the observer, its distinctive sounds are apparently restricted to the reproductive period. Cries similar to those of a flock of parrots at rest high in the trees and off in the distance, as well as strange, manakin-like, snapping noises, are sometimes to be heard in the cool middle-altitude forests. One soon becomes aware that they come from low in the understory and surprisingly close at hand. An assemblage of Green Hermits is responsible for the continual "chrirk chrirk" (or "tlink" or "tlenk") produced by low-perched males scattered over an area perhaps 50 yards square.

The calling bird, holding his bill a little above the horizontal, lifts his head, the feathers of which are slightly erected on the crown, and wags his tail to the rhythm; in some individuals the note is doubled. Dashing up, a female hovers above him excitedly with spread tail, defiant as if to provoke a response. Soon a furious chase, preceded by peculiar hollowly snapping thuds, flashes in and out of the undergrowth, and a violent

fluttering and a machine-like "tsicking" accompany the wild course. After an interval the male returns to his favorite perch. He alights by buzzing about in amazingly swift little sideslips punctuated by the same odd thud, like the tapping of a pencil on an empty matchbox. His tail snaps at each of the thuds, yet these are probably produced by a lightning clack of the mandibles. Capriciously, so to speak, he may rise, in the absence of a female, to zip and snap back and forth above his perch, about-facing quicker than the eye can follow at either end of the tiny flyway. He could be a feathered pellet propelled by exploding caps touched off by invisible rackets on an ethereal one-foot court in an imaginary game of badminton.

***Phaethornis superciliosus* (Linnaeus)**

LONG-TAILED HERMIT

RANGE: Southern Mexico to Bolivia and Brazil.

***Phaethornis superciliosus cephalus*
(Bourcier and Mulsant)**

RANGE: Honduras to western Panama.

The Long-tailed Hermit is distributed throughout the humid life zones of both slopes, from the coastal lowlands to, locally, about 3000 feet in the lower subtropical belt. It is nearly if not quite absent from most of the northwestern Pacific sector, including the Tropical Dry Forest north from the Río Grande de Tárcoles, with the exception of a record from Bolsón in the Tempisque Valley, and from the region of the central plateau; it does occur at gaps on the lower wooded slopes of the Guanacaste Cordillera. Usually avoiding sunlight and open situations, it prefers forest, both virgin and thinned, which it penetrates probably along breaks and watercourses. It is abundant in woodland-bordering, light-flecked, thickety second growth, and I found it also in mangroves.

The bird often hovers vertically, its tail hanging like a leg, at the under sides of palm fronds and other leafy vegetation, probably in search of tiny insects and spiders. Of course, it also regularly visits flowers. It does not, as a rule, forage more than a few yards above the ground nor does it perch on the tips of leafless twigs as do many other hummingbirds. Even in the close presence of

the observer it manages to light at least partially screened by leaves. Nevertheless the projecting white tips of its long tail, constantly moved metronomically up and down through a quarter-circle arc, usually remain in view. Often the two central rectrices are held close together like a single white-tipped narrow plume; I have never seen them scissored or forked. This hummingbird is one of several that dash up to the observer, hover in midair to look him over, then dash away with a loud squeak. The immature bird, differing in its bright reddish orange lower mandible from the adult, waits with slightly opened bill and raised head, as though transfixed upon the branchlet, to be fed regurgitatively by the parent.

The birds gather into singing assemblies of several to many well-separated members. These could be termed "calling" assemblies more accurately, as only a simple "sree" is uttered. The note is repeated in weakly alternating pitch with the tireless regularity of a ticking clock, while the tail vibrates in double-time accompaniment. These large hummingbirds are much easier to find and see than, for example, a singing little Longuemare's Hermit. They perch higher, generally at eye level, on small branches not so confounded with brush, to the approximate site of which they return from freakishly sudden flights. The endlessly continued scratchy and squeaky "sree" (or "tsreet") is given by perched birds (probably males); it is identifiable in repetition. The bird also utters a patterned "tseer tseer tsirr."

***Phaethornis longuemareus* (Lesson)**

LONGUEMARE'S HERMIT

RANGE: Southern Mexico to Peru, the Guianas, and southeastern Brazil; Trinidad.

***Phaethornis longuemareus saturatus* Ridgway**

RANGE: Guatemala to Panama.

The distribution of Longuemare's Hermit throughout the lower elevations in the humid life zones of both slopes is almost identical to that of the congeneric *superciliosus*. Though recorded from three places in the vicinity of the Gulf of Nicoya, it is very uncommon to rare or lacking in the Tropical Dry Forest. On the Caribbean side it ranges commonly into the lower half of the subtropical belt,

where the large *superciliosus* drops out, and, in diminishing numbers, locally into the lower limits of the lower montane belt. In the southwest it is nearly confined to the tropical belt. It is common and occurs at the same places as *superciliosus* along the northwestern divide.

Woodland edges which sunlight does not enter or sun-flecked, shady, thickety second growth is the favored habitat of this little hermit. It enters virgin forest, probably along streams, but becomes uncommon to rare beyond a penetration of a hundred yards or so. It visits plantations regularly and may make daily appearances in the open near houses to sample blossoming hedges. Except when attracted to a localized profusion of flowers or busily giving chase to another hummingbird, this species is normally solitary. It goes about its business within a yard or two of the ground and seldom perches above the understory or conspicuously exposed upon a bare twig.

This tiny species suddenly materializing from nowhere is apt to hover at arm's length from the observer's face. Like a large bee it moves sideways, up, down, forward, backward on blurred wings, showing all it has to display before dashing off wantonly with a predictable squeak, as though frightened. Sometimes it keeps its long tail tightly closed, which then resembles a prehensile appendage, or spread fanwise, when it presents an expanse greater than that of the body. Hovering gnat-like, the bird presses its tail forward, like a lobster flexing its telson, when changing position. Perched, it pulsates the tail as does, for example, *superciliosus*. The finger-like tail acts nervously alive.

Males at least part of the day join loosely into informal singing assemblies that may be chanced upon at almost any season of the year. The sites seem to be temporarily fixed and are nearly always established in shaded, thickety, dense new growth. This is one of several hummingbirds with a "song" and identifiable notes. The song, usually given in chorus, is a rather monotonous singsong of penetratingly sibilant little squeaks. It either sounds something like "squick squick squick · squick · squick," with the first two notes long, the remaining three quick and descending, or "tsee · tsee · tsee tstststs," with the "tsee"

notes descending and followed by rapid "ts" 's. Often it is broken into by a noisy "wr tfttrtr" or a few weak twittering notes. Heard more generally is a squeak of three or four syllables, of which the first is highest and longest, given usually by a single bird moving about.

The singsong seems to issue above the listener who, seeking the source of the disembodied sounds which he may not be sure are those of a bird, is hereby cautioned not to waste his time looking above eye level. He will have enough trouble even when knowing approximately where to search. The birds each call from a favorite perch, usually a low horizontal twig or vine, with bill raised, head turning from side to side, and spread tail pumping rhythmically up and down. A lone bird, too, may sing self-charmed with satisfaction.

I observed on three occasions what may have been variations or different sequences of courtship antics. Once I saw two birds steadily buzzing their wings, like bumblebees, face to face in the air, one opening and closing its bill and thus calling my attention to its yellow mandible, the other with tail spread. Another time a single bird was hovering above a vine with both its head and spread tail raised and its back hollowed to a trough. Thus postured in the air, the bird was rotating a few turns one way, then, reversing direction, the other, while at times it speeded the spinning. On the third occasion I gained the best view. Again a single bird was hanging in the air, rising and falling slightly while leisurely making a three-quarter turn first to the right, then to the left. Every part of the bird was quivering. Its upper breast feathers were raised, thus uncovering an apparent blackish swath across the chest, and from its downstretched legs the extended toes were spread apart like palsied red fingers. Fluffed, trembling, arched at both ends so that the lowest point of the body was the whitish feathers fringing the belly along its bottom, the creature was suspended like a mobile on an alternately twisting and untwisting elastic band. Suddenly the bird shot back and forth a number of times in lightning short zips before resuming its ecstatically posed, dangling display.

Eutoxeres aquila (Bourcier)

COMMON SICKLEBILL

RANGE: Costa Rica to Peru.

Eutoxeres aquila salvini Gould

RANGE: Costa Rica and western Panama.

The Common Sicklebill reaches its northern geographic limit in central Costa Rica; it is distinctly uncommon. On the Caribbean side it is known from the northern and eastern foothill approaches to the central highlands and from the low hills near the coast in the extreme southeast. Probably its distribution is continuous along the lower slopes of the Talamanca Cordillera. Ranging from the upper tropical belt into the lower subtropical belt, it is best known from the Reventazón Valley in Cartago Province. On the Pacific slope it has been recorded at 4000 feet in the Dota region and from the northern (Pozo Azul de Pirris) and southern (Golfo Dulce) sectors of the humid-forested tropical belt. It is not reported elsewhere in the country.

Judged by its few records, the species appears to be at its center of abundance along cool, very humid ridges and slopes at a mean elevation of 3000 feet in the central highlands and possibly along the Talamanca Cordillera, yet it is also present in the wettest parts of the forested lower tropical belt. Wherever found, it frequents the openings and edges so common in hilly broken country. I have seen it feeding only on shrub-borne flowers of several different kinds within a few yards of the ground. The bird perches with its head tilted upward so that the tip of the bill and its base are on the same level. Sometimes it is curious about the observer, as are *Phaethornis* and *Threnetes*, for example.

Phaeochroa cuvierii DeLattre and Bourcier

CUVIER'S HUMMINGBIRD

RANGE: Guatemala to northern Colombia.

Phaeochroa cuvierii roberti (Salvin)

RANGE: Guatemala to northeastern Costa Rica.

Phaeochroa cuvierii maculicauda Griscom

RANGE: Pacific slope of Costa Rica and western Panama.

The race *maculicauda* is distributed over most of the tropical belt on the Pacific side of the country, commonly from the Tempisque basin in the dry-forested northwest southward to Panama. Along the Guanacaste Cordillera it is known from one locality (Miravalles), where the specimen was probably taken in the upper tropical belt. I also found it common in the Río Frío region, which it has entered probably along the southern shore of Lake Nicaragua. In the southwest it is most abundant in the Térraba-General region, apparently least common in the wet-forested Golfo Dulce region; it rises into the lower subtropical belt along the slopes of the Talamanca Cordillera. A record from San Pedro, on the central plateau, probably applies to a vagrant. The previously unrecorded Caribbean race, *roberti*, I found only twice, both times in a new cacao plantation near Puerto Viejo de Sarapiquí in the forested northeastern lowlands (Slud, 1960, p. 95). I collected one January 17, 1958. This bird, subsequently determined as a male with unenlarged gonads, had been singing freely and continually.

Cuvier's Hummingbird is a species of the semi-open that prefers thickets, second growth, clearings with scattered trees or covered with scrub, woodland edges, and new growth in opened woodland rather than heavy forest and deep shade. In suitable localities it is one of the most common hummingbirds on the Pacific slope. During much of the year it apparently spends most of its time on an exposed favorite perch, usually a bare twig several feet to several yards up. Singing tirelessly almost all day long, it is easily found. On the Pacific side many individuals, usually well separated, may dot an area, but they do not often chase one another about. In open woodland the bird is almost strictly solitary. It hovers quite a bit, moving its wings not so rapidly as do smaller species, and, spreading its broad-feathered tail, brightly exposes the large white corners.

Its voice is perhaps the best developed and its recognizable song the most involved in a family notorious for its poor musical ability in Costa Rica. The noisy and confused song, containing squeaky chips and rattling notes, varies somewhat among individuals and also

shows local differences. Usually it sounds something like "stchip·stchip·stchip·stchip skúr wee," perhaps interpolated with sharp "ts" 's or "sit" 's and a rattle like that of the flycatcher *Todirostrum cinereum*; a "tit tit tit" may be tacked on. Or it may consist of a rapid "tsitting" trill or twitter introduced by two slower notes. Other birds belonging to what may be discrete populations have a more deliberate "chip-chip-chep-buzz-chip" which they repeat, or another phrase like it, for long periods. Others utter a less variable, shorter "síp, tsip tsip tseè," often beginning with an almost inaudible "ss," which may be repeated.

***Campylopterus hemileucurus* (Lichtenstein)**

VIOLET SABREWING

RANGE: Southern Mexico to western Panama.

***Campylopterus hemileucurus mellitus* Bangs**

RANGE: Costa Rica and western Panama.

The Violet Sabrewing is known mostly from the central highlands (including the mountains south of the central plateau). It is present along the Talamanca Range to the Panamanian border in the southwest and very probably in the southeast. There is only a single report each from the Guanacaste Cordillera and the Cordillera de Tilarán.

The species is an inhabitant of the cool and humid middle altitudes from about 3000 feet upward through the lower montane belt. It is most numerous in very humid, forested portions of the upper subtropical belt, from which it descends cloud-forested pockets to the lower limits of the belt. It frequents natural breaks, such as stream valleys, broken-canopied woodland, or openings made by man, and even visits tree-scattered fields and pastures on the largely deforested central plateau, especially on the more humid Caribbean side.

Within its range and preferred habitat, it seems to be the only large-sized, curve-billed hummingbird, though frequently joined by *Phaethornis guy* of the forest understory. The large white area on its rectrices is flashed when the perched bird shear-flicks its tail and is conspicuous in flight. Carriker (1910, p. 522) found this species "very pugnacious

and curious, frequently flying up close to a person's head and hovering there, advancing and retreating for some time, unless frightened away by an abrupt movement." I found it neither interested in the observer nor wary of his movements.

It utters the usual sort of hummingbird sounds: a pebbly sharp "tsitting" or "chitttttt"; a piercing "tsit, tsit, tsit"; a wrenlike "tchritttt"; single "tsker" 's; and a two-level deliberate "chíp chùp," repeated and mixed with "chip" 's.

***Florisuga mellivora* (Linnaeus)**

JACOBIN HUMMINGBIRD

RANGE: Southern Mexico to the Guianas, Bolivia, and Brazil; also Trinidad and Tobago.

***Florisuga mellivora mellivora* (Linnaeus)**

RANGE: Same as above except Tobago.

The Jacobin is distributed along both slopes from the coastal lowlands to the lower limits of the subtropical belt. I know of only one record from the central plateau (vicinity of San José), where the bird is probably occasional or seasonal in flower gardens and coffee fincas. It is most abundant in the humid life zones (though not recorded from the southeast, where it surely occurs). It is sparsely present in the Tropical Dry Forest, where it is seldom encountered north of the Gulf of Nicoya. As yet there is no report from the northwestern divide, though I would expect it there, at least on the lower slopes.

This widespread hummingbird is common irregularly or seasonally at any one place. It is found in a variety of habitats, mostly in the semi-open, such as shaded plantations and parklike areas with flowering shrubs and trees. Occasionally it occurs inside humid virgin forest, which it probably enters through openings or along breaks. Usually it is seen alone, sometimes in groups, at almost any height in the trees, often perched conspicuously on a bare twig. Two male-plumaged birds can often be seen facing each other in the air, their white tails spread like a semicircular white fan. The species passes through several intermediate stages of plumage, as noted by Zimmer (1950, pp. 10-14), and I have collected females in adult-male

plumage. I find nothing distinctive in the "tsitting" or squeaking notes of this bird.

***Colibri delphinae* (Lesson)**

BROWN VIOLET-EAR

RANGE: Guatemala to Bolivia and across northern South America to Trinidad and British Guiana.

This brown hummingbird is met very uncommonly in Costa Rica, where it is highly localized or possibly a great wanderer. It is known from widely separated sites primarily in the subtropical belt along the three main mountain ranges. It seems to be least uncommon in the central portion of the country, where it occurs on the Caribbean foothills and slopes, especially the watershed and the valley of the Río Reventazón, and rises from about the 2000-foot mark to the central plateau at least as far as San José. Elsewhere there is a record for the northwestern divide (Miravalles), another for the Térraba region (Boruca, where probably it was taken well above the village), and I found it several times above Potrero Grande on the approach to the Talamanca Cordillera.

The Brown Violet-ear appears not to frequent woodland, even though it is apt to occur in wooded regions. It seeks flowering shrubs, shrubbery, hedgerows, new growth, and woodland borders, as in coffee plantations and gardens or at openings and roadsides. Several individuals may forage at a favorable site together with other species of hummingbirds. Though often seen at hedge and shrub height, it may rise 30 and 40 feet in trees. I have seen it fly-catch rapidly, that is, repeatedly making acrobatic flutters and returning to the same high perch.

***Colibri thalassinus* (Swainson)**

GREEN VIOLET-EAR

RANGE: Mexico to Bolivia and Venezuela.

***Colibri thalassinus cabanidis* (Heine)**

RANGE: Costa Rica and western Panama.

The Green Violet-ear is known almost exclusively from the central highlands, including the Dota region and the northern end of the Talamanca Cordillera. Elsewhere it is known only from the Cordillera de Tilarán, where I found it not uncommon in the very humid upper tropical belt. There is no record

from the main Talamanca Range, along which it probably occurs to Panama. Vertically it is distributed from about the middle of the subtropical belt, at which point it is uncommon, local, or perhaps seasonal, to timber line on the big volcanoes. Though reported from parts of the central plateau, it first becomes common and then abundant upward from 5000 feet or so (in the central highlands).

The species seems not to be a forest inhabitant, because it thrives in the parklike pastures and "elfin woodland" which succeed the partial removal of mountain forest. It feeds primarily on the contents of flowers, of which there is a profusion on every epiphyte-laden stump and shrub at the high altitudes. Indeed, individuals have their foreheads often whitened or yellowed with pollen. It frequents the mountain vegetation at various heights, perching high in tall trees and on ground cover and brush in openings. It utters snapping little rips and an often-repeated "chíp tsiir," the latter note sounding ventriloquially close at hand. This call, or "song," is given endlessly during the breeding season, presumably by mates spaced well apart, usually high in the trees.

***Anthracothorax prevostii* (Lesson)**

PRÉVOST'S MANGO

RANGE: Northeastern Mexico to Costa Rica; northwestern Venezuela; Old Providence and St. Andrew islands.

***Anthracothorax prevostii gracilirostris* Ridgway**

RANGE: El Salvador and Honduras to Costa Rica.

Prévost's Mango is largely confined to the northern half of the Pacific side of the country. Probably present in, though not recorded from, northern Guanacaste, it extends southward from Liberia through the Tropical Dry Forest to the tip of the Nicoya Peninsula and to the Río Grande de Tárcos, near the southern border of the life zone, on the mainland. It is apparently most abundant in the Tempisque basin and at the head of the Gulf of Nicoya. Southward on the mainland it seems to be largely coastal. It has been recorded at least twice from the vicinity of San José, where it occurs probably irregularly in very small numbers as a seasonal wanderer

to the central plateau; I never met it there. Richmond (1893, p. 517) reported it rather common at San Carlos, at the southeastern corner of Lake Nicaragua, and I found it abundant in the nearby Río Frío region on the Costa Rican side. Very likely it is present along the entire southern shore of Lake Nicaragua and possibly spreads eastward into the San Carlos region of Costa Rica. The species frequents open and semi-open situations, such as the borders of scrubby woodland and patches of open forest, tall hedgerows, shrubby growth and trees in overgrown or abandoned agricultural and ranch lands, low trees along river banks, and also mangroves. I noted nothing specifically distinct about its habits.

[*Anthracothorax veraguensis* Reichenbach

VERAGUAN MANGO

RANGE: Pacific slope of western Panama.

A male specimen (A.M.N.H. No. 37303) has, according to the label, Costa Rica as its provenance. The label lacks locality, date, and name of collector. As it is not the original one, its correctness is disputable, even apart from the absence of any other Costa Rican report. Should this Panamanian hummingbird indeed occur in Costa Rica, it is most apt to be present in the Pacific southwest.]

***Klais guimeti* (Bourcier)**

GUIMET'S HUMMINGBIRD

RANGE: Honduras to Bolivia and western Venezuela.

***Klais guimeti merrittii* (Lawrence)**

RANGE: Honduras to Panama.

Guimet's Hummingbird has three centers of distribution which are probably connected. Most records are from the central part of the country, especially the Caribbean versant of the central highlands and the contiguous northeastern lowlands. In the southwest it is restricted to the General-Térraba region, where it is fairly common, and the Golfo Dulce region, where I found it, rarely, only at Rincón de Osa. It is also present along the northwestern divide, from the Arenal gap northward. It is absent from the Tropical Dry Forest and virtually all the Pacific side of the central plateau. Vertically it ranges from the

lowlands into the upper subtropical belt and penetrates the lower montane belt locally. Apparently it breeds mostly in the upper portion of the tropical and in the subtropical belts and spends the rest of the year, wholly or in part, at lower elevations.

It occurs mostly in generally wooded regions in which there are clearings, openings, and plantations or pastures with shrubs and trees. In such semi-open situations I found it most often along thickety borders, at flowering hedgerows, and in yards and gardens. It has been reported from forest, but I doubt its presence deep in solid woodland. Generally it keeps rather low, at the height of shrubs and shrubbery, but it also visits the blooming crowns of medium-sized trees. It is seen singly or, more often, spaced apart severally at a favorable site. Sometimes a few individuals can be viewed at once on the same hedge with other hummingbirds. Even when poorly seen, this species is recognizable by its gnat-like, weaving, dancing hover. Probably fly-catching, it holds itself horizontally and flicks its upraised tail.

The bird makes a pebbly twitter, a constant rapid "tsitting" or twittering, or a buzzy "tchrip tchrip tchrip" that sounds, when speeded up, like the twitter of a grasshopper. These vocalizations may or may not be the same as those heard by Skutch (1958a), who wrote concerning the song of the male that it is a "spirited, simple chant," that "the song, sharp and rapid, possesses a certain elementary rhythm," that "although there is considerable variation in the utterances of different individuals, none is really musical," and that it is "lacking in melody."

***Lophornis delattrei* (Lesson)**

DE LATTRE'S COQUETTE

RANGE: Mexico; Costa Rica to Bolivia.

***Lophornis delattrei lessoni* Simon**

RANGE: Costa Rica to Colombia.

I find reference to only four Costa Rican specimens, all males and all taken in the month of October in different years (1892, 1900, 1906) at San Pedro near San José on the central plateau. Whether a straggler in Costa Rica, as suggested by Carriker (1910, p. 552), or of very local occurrence, it is a very rare bird. The species has been collected at least

once in the Caribbean lowlands of Bocas del Toro Province, Panama, and several times in Chiriquí Province, Panama, which thus suggests that it probably occurs on both slopes in adjacent Costa Rica.

***Lophornis helenae* (DeLattre)**

PRINCESS HELENA'S COQUETTE

RANGE: Southern Mexico to Costa Rica.

This Central American coquette reaches its southern geographic limit in central Costa Rica. Almost all the collecting sites lie in the subtropical belt along the Caribbean sides of the Cordillera Central, especially the drainage of the Río Reventazón. The bird has been taken also in the vicinity of San José on the central plateau. In addition, I collected it at Tenorio in the Guanacaste Cordillera and observed it a few times in the Sarapiquí lowlands in the northeast. Excepting wanderers, it would appear to be virtually restricted, therefore, to the Caribbean slope, with its center of abundance in the upper tropical and lower subtropical belts.

A nonforest species, this tiny hummer occurs in clearings and other openings, in plantations, along roadsides, where patches of shrubby growth and small and medium-sized trees and perhaps a few tall ones are mixed, even in extensively forested areas newly breached by man. Usually it perches on bare twiglets from several yards up to the tips of rather tall stubs. Its manner of flight and appearance in the air are both beelike. I have met it only singly at irregular intervals, nowhere more than a few scattered individuals at a time, most of them female-plumaged. When occasionally an adult male is encountered at rest, the diminutive creature is seen to sport a shaggy black "beard," buff "sideburns," crest feathers raised like war plumes, and a bright reddish bill.

***Lophornis adorabilis* Salvin**

ADORABLE COQUETTE

RANGE: Costa Rica and western Panama.

The Adorable Coquette is known from the central and southwestern parts of the country. On the central plateau, including its edges and contiguous mountain slopes, and on the Caribbean versant bordering the central highlands, particularly the valley and watershed of the Río Reventazón and the

slopes of Turrialba Volcano, its range almost completely overlaps from the south that of the congeneric *helenae* from the north. Here it is distributed vertically from the lower limits of the subtropical belt to, probably, the border of the lower montane belt. On the humid-forested southern half of the Pacific side, it is known primarily from the Térraba region, especially the upper tropical belt and adjacent parts of the subtropical belt along the Talamanca Cordillera, where it is common to abundant locally. It is also known from the peninsular coast of the Golfo Dulce, apparently in very small numbers.

A nonforest species, it evidently prefers and does best at the edges of scrubby woodland, in shrubby openings with scattered trees, and at partially cutover borders mixed with second growth. All the reports apparently stem from hilly sites. Though usually seen singly or occasionally in pairs, it may gather in small groups at a flowering tree. Its flight and hover are beelike, and the tail and hindquarters of the foraging bird are constantly waving up and down.

Popelairia conversii (Bourcier and Mulsant)

GREEN THORNTAIL

RANGE: Costa Rica to western Ecuador.

This distinctive little species, in Costa Rica at its northern geographic limit, is known exclusively from the Caribbean slope. It is typically an inhabitant of the cool and humid subtropical belt, mostly upward from 2500 feet along the northern and eastern slopes of the Cordillera Central and, especially, the Reventazón watershed. Probably it spreads to adjacent portions of the Pacific versant under the Caribbean climatic regime. It has not been recorded southward from the eastern slope of the Talamanca Cordillera, along which it probably occurs, or the northwestern divide, from which it is probably absent. Though it does not normally range below the upper limits of the tropical belt, I found a wandering individual or two in late August and early September of different years near Puerto Viejo in the north-eastern lowlands.

The thornail occurs in wooded regions where it frequents the edges at natural breaks, openings, stream and river valleys, without penetrating the forest. Under these

conditions, it visits flowering vegetation along borders of one sort or another and sometimes is seen on small trees scattered over a clearing beside forest. Generally it occurs from shrub height to, occasionally, high on the outer foliage of tall trees. Its usual hovering and foraging flight is beelike.

Chlorostilbon canivetii (Lesson)

FORK-TAILED EMERALD

RANGE: Central Mexico to Colombia and Venezuela.

Chlorostilbon canivetii salvini

Cabanis and Heine

RANGE: Nicaragua and Costa Rica.

Chlorostilbon canivetii assimilis Lawrence

RANGE: Southwestern Costa Rica and Panama.

The Fork-tailed Emerald in Costa Rica is basically a Pacific species made up of two populations. The northern form, *salvini*, is distributed primarily over the northwestern, Pacific quadrant of the country, just as are a number of species of the Central American arid Pacific avifauna. It is relatively uncommon, however, in the Tropical Dry Forest, but rises abundantly on the neighboring deforested slopes of the continental divide. It is common on the Pacific portion of the central plateau, from which it ascends the neighboring slopes to perhaps the lower montane belt and spreads southward into the Dota region. It is quite uncommon on the Caribbean slope, which it overlaps from the central plateau down to 2000 feet in the Reventazón drainage. The southwestern form, *assimilis*, is known primarily from the middle and upper portions of the subtropical belt in the Térraba region, where it is not common. The two forms apparently meet in the Dota region, approximately midway between the main parts of their mapped ranges.

This little species prefers open and semi-open country, wherever there are shrubbery, hedges, bushes, and other flowering low growth. It is very common on the bush-dotted grassy lower slopes of the Guanacaste mountains and abundant in yards and flower gardens amid the coffee lands on the central plateau. Perhaps, with the continuing spread

of its habitat, the bird will descend fanwise into the lower Caribbean side of the country. The only "song" that I have heard is an endlessly repeated, characterless wiry "tsee tseeree."

***Thalurania furcata* (Gmelin)**

COMMON WOOD NYMPH

RANGE: Mexico to Bolivia and northern Argentina; Trinidad.

***Thalurania furcata venusta* (Gould)**

RANGE: Nicaragua to western Panama.

This common species is widely distributed over the humid life zones along both slopes, from the lowlands through the lower half or, locally, two-thirds of the subtropical belt. It is present along the northwestern divide, which it overlaps from the Caribbean side. It seems to be quite absent from the Tropical Dry Forest and virtually all of the central plateau.

The wood nymph is one of the few hummingbirds regularly found inside woodland, but occurs much more plentifully at the overgrown forest border, in second growth, and in plantations and abandoned clearings both in virgin-forested and partially deforested country. It also regularly visits shrubs and small trees in the neighboring semi-open. Keeping from eye level to no more than several yards above the ground, it often returns to favorite perches inside forest and in shaded leafy or thickety second growth. As a rule it is not shy, often perching in open view in the understory and hovering close to the observer. It constantly looks about alertly, probably for tiny flying insects, and its bill is often coated with pollen. The perched bird at times constantly extends its tongue in a reptilian manner, and the male features a slight twitching of his not necessarily forked tail at irregular intervals. It makes a weak "tsitting" and a series of "tk" 's.

***Panterpe insignis* Cabanis and Heine**

IRAZÚ HUMMINGBIRD

RANGE: Costa Rica and western Panama.

The Irazú Hummingbird is nearly confined to the mountaintops of the Cordillera Central and the Talamanca Cordillera. Its center of abundance is in the montane belt

up to the limit of trees, from which it descends into the lower montane belt in decreasing numbers. High on the cold and misty central volcanoes it is one of the very abundant birds, especially in the parklike pastures with their flowering shrubs, stumps, and fantastically encrusted misshapen trees and stubs laden with epiphytes. An energetic, glittering flower prober, it usually keeps fairly low but also rises to medium heights at and behind the woodland border. Ferry (1910, p. 263), high on Turrialba Volcano in the month of February, wrote: "The males were constantly engaged in combat, performing some amazing antics while on the wing. This species was breeding at this season. . . . [It] was noticeable for the frequency with which it resorted to perching and the length of time it spent in this position." The bird utters a rapid set of two or three snaps, not unlike those of a manakin, and a constant reedy throaty twitter, either staccato or tittering.

***Damophila julie* (Bourcier)**

JULIE'S HUMMINGBIRD

RANGE: Costa Rica to western Ecuador.

***Damophila julie panamensis* Berlepsch**

RANGE: Costa Rica and southwestern Panama.

This species is included in the Costa Rican ornithology on the basis of two specimens, both without definite locality or date, that have "Costa Rica" on their labels. One, which is in the collection of the United States National Museum, was reported by Lawrence (1868-1870, p. 128) as having been taken by J. Carmiol. Probably it was this specimen which Ridgway [1911 (1901-1950), pt. 5, p. 521] referred to as "one adult male said to be from Costa Rica" and which Frantzius (1869, p. 317) listed as "*Juliomyia typica* Bonap." for Costa Rica. The other specimen is in the American Museum of Natural History (A.M.N.H. No. 60150). It was collected by a Captain Dow, concerning whom Carriker wrote (1910, p. 359): "During 1863-4 Capt. J. M. Dow (captain of one of the Pacific Mail boats) collected a few birds at Puntarenas while the steamer was there at different times." Perhaps Dow made other stops along the coast of Puntarenas Province, which stretches all the way to Panama. If so,

his bird was probably collected somewhere near the Panama border.

***Lepidopyga coeruleogularis* (Gould)**

DUCHASSAIN'S HUMMINGBIRD

RANGE: Costa Rica to northern Colombia.

***Lepidopyga coeruleogularis coeruleogularis*
(Gould)**

RANGE: Costa Rica and southwestern Panama.

The Costa Rican status of this hummingbird is similar to that of the preceding species. Ridgway [1911 (1901–1950), pt. 5] gave its range as "Panama and southwestern Costa Rica" in his key (p. 538), but did not include Costa Rica in the systematic account (p. 539). This reference and most others seem to apply to a specimen in the Gould Collection, concerning which Mr. J. D. Macdonald of the British Museum wrote me: "The Gould specimen . . . has a small label with the information 'Costa Rica' on it, and nothing else. There seems, however, no reason to doubt that it came from there, since Gould in the Monograph of the Trochilidae, volume five, plate 346 states, ' . . . my own were obtained in Costa Rica.' "

There exists a second specimen (M.C.Z. No. 153783), mentioned by Aldrich (Aldrich and Bole, 1937, p. 72), in regard to which Dr. R. A. Paynter, Jr. advised me as follows: "On the front of the label is the name, sex (♀), and locality (Costa Rica). On the reverse are the numbers 1674. C; 410. C. 25; 32. The catalog states the specimen was obtained from Rosenberg, but not when. No other information is available."

Mr. Eugene Eisenmann tells me the species is common in western Chiriquí Province; hence it occurs most likely in adjacent southwestern Costa Rica.

***Hylocharis eliciae* (Bourcier and Mulsant)**

ELICIA'S GOLDENTAIL

RANGE: Southern Mexico to western Panama.

Elicia's Goldentail is distributed primarily on the Pacific side from sea level to the lower subtropical belt. It is most numerous on the lower wooded slopes of the Guanacaste Cordillera immediately above the cleared ranch lands and is fairly common in the dry-

forested lowlands southward from central Guanacaste, especially the Tempisque basin, in shaded patches of woodland with streams. It becomes very common again in the far southwestern General-Térraba region. Though rarely recorded from the central plateau, it is probably not infrequent seasonally. It is uncommon on the Caribbean slope, where it occurs mostly in the upper tropical and lower subtropical belts, and has not been reported south of the Reventazón Valley. In the northeastern lowlands, I found it in small numbers for approximately half of the year (April–August), hence suspect it may be largely seasonal elsewhere on the Caribbean side.

Though it generally prefers wooded areas, this hummingbird does not inhabit the interior of unbroken woodland. Rather, it frequents gallery-forested breaks and stream-sides, thickety woodland edges, dense new growth mixed with emergent young trees in clearings, and opened woodland; seldom is it seen exposed in the open. It usually keeps fairly low, from eye level to the lower branches of medium-sized trees. Its sounds include a hummingbird-like "ss ts·ts·ts·ts·ts·ts" and a warbler-like song of usually four two-syllables notes: "see·bit see·bit see·bit see·bit" (or "weetsa" or "peetsa"), perhaps interpolated with a few "tsit" 's.

***Amazilia candida* (Bourcier and Mulsant)**

WHITE-BELLIED EMERALD

RANGE: Mexico to Costa Rica.

***Amazilia candida candida*
(Bourcier and Mulsant)**

RANGE: Southern Mexico to Costa Rica.

The White-bellied Emerald is at its southern geographic limit in Costa Rica; possibly it will yet be found in adjacent Panama. In Costa Rica it has been recorded from only four localities: the vicinity of San José on the central plateau, Peralta on the lower slope of Turrialba Volcano, Coronado on the Térraba delta, and Puerto Jiménez on the Osa Peninsula. This distribution suggests that it may be scattered sparsely through the humid lower portions of both slopes, where it has perhaps been overlooked by collectors. Interestingly, Coronado de Térraba is the same coastal locality at which the mangrove-

can record, that of the type of *A. c. alfaroana*, collected and described by C. F. Underwood, who wrote (1896, p. 441): "Something unfamiliar about this bird induced me to shoot it; it was the only specimen that I was able to procure, and was taken at a pretty high point" (at Miravalles). The collecting locality is probably within the range of the very similar *A. saucerottei*.

***Amazilia cyanura* Gould**

BLUE-TAILED HUMMINGBIRD

RANGE: Southern Mexico to Costa Rica.

***Amazilia cyanura cyanura* Gould**

RANGE: El Salvador to Costa Rica.

The only Costa Rican specimen was collected in October, 1904, by Underwood at San Pedro, near San José, on the central plateau. According to Bangs (1906, p. 105), this was "the only individual Underwood ever saw; but it must be borne in mind that the ornithology of much of Costa Rica remains still unknown . . . and this hummer may yet be found in numbers somewhere." It was not reported again until I found it May 18, 1958, in the northeastern sector of the country (Slud, 1960, p. 95). The bird drew my attention because at first glance it resembled *A. saucerottei*, a Pacific species unknown in the Caribbean lowlands. The chestnut patch on its wing was not merely conspicuous but at times actually raised as in display, though I saw no companion bird. The bird returned repeatedly to the same few shrubs after foraging or chasing about. The congeneric *amabilis* and *tzacatl* were abundant, and several other hummingbirds were present at the same semi-open site.

***Amazilia saucerottei* (DeLattre and Bourcier)**

SAUCEROTTE'S HUMMINGBIRD

RANGE: Nicaragua and Costa Rica; Colombia and western Venezuela.

Amazilia saucerottei hoffmanni

(Cabanis and Heine)

RANGE: Nicaragua and Costa Rica.

Saucerotte's Hummingbird is nearly confined to the northern half of the Pacific slope, including the central plateau. One of the common birds of the Tropical Dry Forest, it is present in large numbers on the lower slopes

of the northwestern divide and from the Tempisque basin to the Puntarenas-Barraanca district. Sweeping abundantly eastward over the "meseta," it rises to the lower limits of the lower montane belt on the neighboring mountain slopes. It barely reaches the upper Reventazón Valley on the Caribbean side, but has been recorded, probably as a wanderer, from the east slope of Turrialba Volcano and the lower northern slope of the Cordillera Central at the gap between Barba and Irazú volcanoes. It is also known from the Dota region, its southernmost limit in Central America. I did not find it in the Río Frío region, where I thought beforehand that I would.

This is a nonforest species associated with rural or deforested areas generally, including open or cutover tracts with scattered low growth, agricultural lands, scrubby pastures, coffee plantations, and flower gardens. Its limited entry to the Caribbean slope, where it is still uncommon to rare, follows routes prepared by man. The bird generally keeps low, at bush or shrub height, and it seems to maintain a feeding territory. Its wings produce a fluttering or whirring hum strong even for a hummingbird. Vocally it makes an excited "chitting" or "tsitting" that may take the form of a patterned trill which descends and accelerates while losing strength. What may be the "song" is a thin, almost "spinking" "peép peép."

***Amazilia edward* (DeLattre and Bourcier)**

SNOWY-BREASTED HUMMINGBIRD

RANGE: Costa Rica and Panama.

***Amazilia edward niveoventer* (Gould)**

RANGE: Southwestern Costa Rica and western Panama.

The Snowy-breasted Hummingbird is confined to the far southwest, from the General region to the Panamanian border, mostly along the approaches to and slopes of the Talamanca Cordillera, exclusively in the upper tropical and lower subtropical belts. Though I also found it common at Boruca, it is not, as Carriker (1910, p. 528) believed, "evidently common from there southward," because it is still not known in the Golfo Dulce lowlands or elsewhere in the wet-forested tropical belt to Panama. The Costa

Rican and Chiriquí populations are probably continuous only well inland along the mountain slopes.

Carriker noted (*loc. cit.*): "They are attracted in great numbers by the flowers of the 'Guava' tree, of which there are considerable numbers in the village of Boruca, planted there by the Indians years ago. . . . Where the birds spend the time while the guava trees are not in blossom I do not know, but very likely in the scrub and second-growth so common in that region." The species does indeed seem to be local or seasonal at a particular site; I could not predict where or when to find it in apparently suitable habitat. I met it only in semi-open situations, such as woodland borders, openings between patches of woodland, tree-, shrub-, and thicket-scattered agricultural and pasture lands, cutover areas, and scrubby open woodland. Sometimes a number of birds congregated at flowering medium-sized trees and shrubs, but more often I saw it singly, usually not below middle heights. This hummingbird makes a recognizable three-syllable call, "tirr tirtir" (or "tseer titir"), with the first note prolonged, the doubled second note short and weak. A "tseer tseer" similar to the last is also given.

Amazilia rutila (DeLattre)

CINNAMON HUMMINGBIRD

RANGE: Western Mexico to Costa Rica; Tres Mariás Islands.

Amazilia rutila rutila (DeLattre)

RANGE: Western Mexico to Costa Rica.

The Cinnamon Hummingbird, a member of the Central American arid Pacific avifauna at its southernmost limit in Costa Rica, is an indicator species of the Pacific northwest. It is probably the most abundant hummingbird in the dry-forested lowlands and on the deforested slopes of the Guanacaste Cordillera up to subtropical elevations. It is an infrequent though probably regular visitor to the central plateau, where it is rarely collected. Two specimens taken by Underwood at Peralta, now housed in the Universidad de Costa Rica, may have been mislabeled, as there is no other report from the Caribbean slope. I expected to find it in the Río Frío region but did not see it there.

It is similar in appearance and actions to the congeneric *tzacatl*, with which it is sympatric almost everywhere in the northwest and than which it is much more abundant in the drier portions of its range. To quote Carriker (1910, p. 530), "the bird is seldom met with in any other situation than very open woodland, bushy pastures, and second-growth scrub, as a rule perching not very high above the ground." Rather than dashing about, it may fly slowly or hover soundlessly, often amid low open growth. It makes the same sort of descending "tsittering" trill as *A. tzacatl*, scratchy "tit"'s, and a soft "tsuck" or "tseck."

Amazilia tzacatl (De la Llave)

RIEFFER'S HUMMINGBIRD

RANGE: Eastern Mexico to western Ecuador and western Venezuela.

Amazilia tzacatl tzacatl (De la Llave)

RANGE: Eastern Mexico to Colombia and western Venezuela.

Rieffer's is the most widespread and generally most plentiful hummingbird in Costa Rica, from both coasts upward through most of the subtropical belt and occasionally into the lower montane belt. It is least common in the Tropical Dry Forest, where it is sympatric with the very common *rutila* around the Gulf of Nicoya, but is almost if not entirely replaced by the latter in northern Guanacaste. Over the rest of its range, including the central plateau, it is found almost everywhere in overgrown open and semi-open country and at thickety borders and woodland edges. It is uncommon in extensively forested regions, yet may be locally abundant at openings and in cultivated lands. In most places it is the common dooryard hummingbird, the one that frequently enters dwellings.

An active, excitable, aggressive bird that successfully accompanies the rural spread of man, it probably nests, as suggested by Cherrie [1892 (1891-1892), vol. 9, p. 325], every month of the year. It may occur in "colonies" of independent individuals that continually chase one another about in places having many flowering shrubs and hedges. At the lower elevations it is found with the equally abundant congeneric *amabilis* in generally wooded country.

It makes a not unmusical descending trill of rapidly given "ts"'s, a "tchup" (or "stchup"), and a somewhat reedy nasal "ca ca ca." Its "song" consists of two to four sibilant, piercing, opposingly accented "tss"'s. A burred or buzzy morning song brings to mind the call of the grassquit *Volatinia*; it is also given in flight.

***Eupherusa eximia* (DeLattre)**

STRIPE-TAILED HUMMINGBIRD

RANGE: Southern Mexico to western Panama.

***Eupherusa eximia egregia* Sclater and Salvin**

RANGE: Costa Rica and western Panama.

This hummingbird is largely restricted to the cool middle altitudes, where it is known best from the Caribbean versant of the central highlands, especially the Reventazón watershed, and the mountainous Dota region. It has been found at four localities along the Guanacaste Cordillera, and I met it also at Monteverde on the Cordillera de Tilarán, where it was common. Though reported from only three localities on the Talamanca Cordillera, these extend from its northern tip to the Panamanian border. Probably the distribution of the bird is continuous the length of the country. Its center of abundance coincides with the upper half or two-thirds of the subtropical belt where heavily forested and probably the adjacent lower montane belt. The total vertical range extends higher through most of the lower montane belt and lower to the lower subtropical belt. The bird has been taken at 700 feet beside the continental divide in northern Guanacaste, apparently under special climatic conditions, because it was there that Austin Smith collected other high-altitude and Caribbean species.

My limited experience with the Stripe-tailed nearly agrees with Carriker's (1910, p. 534): "It is entirely a woodland bird, rarely coming to the edge of the forest to feed on the flowers there. It is not a common bird even in the most favored localities and one not always taken by collectors." I did not find it inside the gloom of solid woodland but at natural openings and breaks, man-made breaches, and overgrown borders: places in which shrubs, thickets, and vines are most apt to be in blossom. Largely arboreal, it

often keeps approximately at medium heights, but it also frequents shrubs and shrubbery. It constantly flashes the white in its tail and makes a pebbly "tsitting."

***Eupherusa nigriventris* Lawrence**

BLACK-BELLIED HUMMINGBIRD

RANGE: Costa Rica and western Panama.

The little Black-bellied Hummingbird is a Caribbean species known mostly from the central highlands. There it is distributed along the northern and eastern slopes of the Cordillera Central and the eastern edge of the plateau region. It also occurs on ridges and slopes in the mountainous parts of Limón and Cartago provinces that rise toward the northern sector of the Talamanca Cordillera, along which it undoubtedly continues into Panama.

The bird is met more or less regularly in the very humid portions of the upper half of the subtropical and in the lower montane belts, always in a heavily forested environment, but is most apt to be seen at the many breaks and edges in the hilly terrain. Usually it occurs rather low in the understory, but it also rises considerably higher in the trees. Locally it may be very common together with *Lampornis hemileucus* of almost identical distribution. As with other very small species its flight is beelike.

***Elvira chionura* (Gould)**

WHITE-TAILED EMERALD

RANGE: Southwestern Costa Rica and western Panama.

The White-tailed Emerald is confined to the southern half of the Pacific side of the country, from the Dota Mountains southward along the Talamanca Range to Panama. Inhabiting the lower middle altitudes, it has, apparently, its center of abundance along the middle of the subtropical belt, the upper or lower limits of which the bird hardly trespasses. It has been recorded also from Boruca in the lower Térraba Valley, but it was almost surely taken there in the forested hills above the village, probably at or close to subtropical elevations. Though seldom collected, it is by no means rare. I met it commonly, that is, daily, at three localities along the Talamanca Range.

Primarily an inhabitant of forest, as is the congeneric *cupreiceps* on the Caribbean slope, generally where the topography is broken or the canopy interrupted, it frequents the leafy understory. Here the only other hummingbird commonly present is *Phaethornis guy* or, locally, *Thalurania furcata*. It is also seen at woodland borders and sometimes beside a trail in second growth near woods. In common with so many white-tailed birds, it flashes the white during the constant opening and closing of its tail. The only sound I have heard is a characterless "srit srit."

***Elvira cupreiceps* (Lawrence)**

COPPERY-HEADED EMERALD

RANGE: Costa Rica.

The Coppery-headed Emerald shares with few other species the distinction of being a Costa Rican endemic. It is found mostly on the Caribbean versant of the central highlands and lives in a climate and a habitat and at an altitude analogous to those of the congeneric *chionura* in the Pacific southwest. Its dozen or so known localities are rather evenly distributed along the northern and eastern slopes of the Cordillera Central, from the western approach to Poás Volcano to the eastern foothills of Turrialba Volcano and the upper Reventazón Valley. I also found it not uncommon at Monteverde, which overlooks the Guanacaste lowlands, and at El Silencio above Lake Arenal, both on the Cordillera de Tilarán. Most of the localities lie in cool and very humid portions of the subtropical belt, the others at the transition upward to the lower montane belt or downward to the tropical belt under similar environmental conditions.

The bird lives in forest and keeps rather low in the understory, sometimes below eye level. Where common it can also be seen, again low, at the woodland border, sometimes in a shrub in the semi-open. Even aside from differences in color of plumage, it can be distinguished in life from the straight-billed *chionura* by its curved bill. Also, it has the habit, which I did not happen to notice in *chionura*, of moving from side to side in the air while hovering, as do certain insects. It has a weak, warbler-like "song."

***Microchera albocoronata* (Lawrence)**

SNOWCAP

RANGE: Nicaragua to western Panama (Veraguas).

***Microchera albocoronata parvirostris* (Lawrence)**

RANGE: Nicaragua and Costa Rica (and probably northwestern Panama).

The Snowcap is a Caribbean species that ranges from the lowlands to at least the middle of the subtropical belt. It reaches the Pacific side of the northwestern divide, so far as known, only at Miravalles, where I met it several times at approximately the 2000-foot mark, the junction of the descending forested slopes and the ranch lands rising from below. This generally not uncommon bird seems to be most abundant in the hilly central part of the Caribbean slope. South of Puerto Limón it apparently diminishes greatly in numbers, at least in the tropical belt; there is one record for the Sixaola region beside Panama.

A woodland species, it is seen at openings, breaks, plantations, thickets, and hedges to a much greater extent than inside forest. It keeps from below eye level to a few yards up, but sometimes rises higher in forest. In both sexes the obviously short tail becomes conspicuously white-sided in flight. The male especially, flicking his tail, flashes the white when hovering. Also, the eye-catching white crown patch of the male often resembles a disembodied oval shield floating about. The species makes a weak "titting" and weak, warbler-like "tsit" 's, somewhat spaced apart.

***Chalybura urochrysis* (Gould)**

GOULD'S PLUMELETER

RANGE: Nicaragua to northwestern Ecuador.

***Chalybura urochrysis melanorrhoa* Salvin**

RANGE: Nicaragua to extreme northwestern Panama.

Eisenmann and Howell (1962) have traced the introgression of several characters in *melanorrhoa* and *isaurae* in northwestern Panama. Evidently the two forms interbreed freely in the zone of contact and should be considered conspecific. In Costa Rica the plumeleeter is restricted to the Caribbean

slope. It is fairly common to abundant through most of the tropical belt, infrequent, except locally, in the lower subtropical belt, whence it is recorded occasionally on the northern slope of the Cordillera Central and regularly on the eastern slope of Turrialba Volcano and along the Reventazón Valley to Juan Viñas. One of the few hummingbirds regularly seen inside forest, it is found more often along forest borders and in contiguous, shaded, thickety, and tangled vegetation, also in subforest and thinned woodland. Occasionally it enters the nearby semi-open under conditions that other hummingbirds also find attractive.

It is met alone, sometimes in pairs, never in groups, usually from eye level to a few yards up in the understory in shaded places or somewhat higher in riverside growth. One of the larger species, it has a rather long broad-feathered tail and pink or reddish feet which show to advantage when the bird hovers close to look the observer over. It makes the usual variable "ticking" trills or twitters and resonant single "tsick" 's of a hummingbird. What may be the song is a hollow "pirp-pirp-pirp," which I also transcribed as a weak gurgling "churk," followed by a little roll.

Lampornis hemileucus (Salvin)

WHITE-BELLIED MOUNTAIN GEM

RANGE: Costa Rica and western Panama.

The White-bellied Mountain Gem is known in Costa Rica almost exclusively from the mountainous central portion of the Caribbean slope. It is virtually restricted to the subtropical belt, from the north face of the Cordillera Central to, so far as known, the foothills and ridges that approach the northern sector of the high Talamanca Cordillera; almost certainly it continues onward to Panama. It has also been taken on the Pacific-facing southwestern slope of Irazú Volcano and the mountains along most of the southern edge of the central plateau. It is not recorded from the northwestern divide or the Dota region, in both of which it may be present. Its center of abundance is at approximately 4000 feet, from which the bird probably rises little higher and perhaps descends only locally a little below the limits of the subtropical belt.

I consider it primarily a forest-inhabiting species which, judged by the places in which I have found it, thrives in the wet-forested cool narrow belt outlined above. It is perhaps numerically dominant among habitat-sharing hummingbirds. It is seen most often at natural breaks, cuts, small openings, and beneath interruptions in the canopy, keeping fairly low in the broken terrain. In such places the rank understory and profusion of vines provide a more regular and considerably richer supply of blossoms than is found in the shade of solid forest. In life, incidentally, this species does not have a neat, clean-cut appearance.

Lampornis calolaema (Salvin)

PURPLE-THROATED MOUNTAIN GEM

RANGE: Western Nicaragua, Costa Rica, western Panama.

The treatment here followed of the interrelationships among *calolaema*, *castaneoven- tris*, and *cinereicauda* is that of Blake (1958, pp. 519-521), who confined it to males. Purple-throated birds form a monotypic species, *L. calolaema*, now that the race *pectoralis*, which Salvin described from apparently aberrant individuals, has been invalidated. White-throated birds are considered a separate species, *L. castaneoven- tris*, with a gray-tailed form, *cinereicauda*, in Costa Rica and a blackish-tailed form, *castaneoven- tris*, in western Panama.

The Purple-throated Mountain Gem is distributed throughout the central highlands primarily, from the Cordillera Central southward through the mountains to the Dota region and to the northern tip of the Talamanca Cordillera, but, so far as known, no farther. South of the central plateau it is sympatric with *castaneoven- tris*. In the northwest it is known from one locality, Tenorio, in the Guanacaste Cordillera, but I found it plentiful at Monteverde on the Pacific face of the Cordillera de Tilarán. A common inhabitant of the middle altitudes, most abundant in the upper subtropical and lower lower-montane belts, it is met regularly upward almost to the montane belt but very locally and uncommonly downward to the lower limits of the subtropical belt. It occurs as a rule in the vicinity of woodland, either at hilly breaks in

forested terrain or along the edges of openings. In the region of the central plateau it mostly frequents the partially wooded slopes that overlook the "meseta."

***Lampornis castaneoventris* (Gould)**

WHITE-THROATED MOUNTAIN GEM

RANGE: Costa Rica and western Panama.

***Lampornis castaneoventris cinereicauda*
(Lawrence)**

RANGE: Costa Rica.

The White-throated Mountain Gem, represented in Costa Rica by the gray-tailed *cinereicauda*, inhabits the mountains in the southern half of the country. From the southern edge of the central plateau through the Dota Mountains, where it is apparently most abundant, and at the northern end of the Talamanca Cordillera it is sympatric with its Purple-throated congener, *calolaema*. Southward along the Talamanca Range it is known only from the Pacific side, where Carriker (1910, p. 541) "found it fairly common near the tops of the mountains above Ujurrás de Térraba," and I found it once at about 4000 feet at Helechales above Potrero Grande. The distribution is probably continuous between the Dota and Térraba regions, but whether it continues farther south or includes the Caribbean versant is not known.

In Costa Rica the Purple-throated seems to have been primarily a Caribbean species that followed the spread of man-made clearings across the central plateau and into the Dota region, which climatically is Caribbean but geographically Pacific. To quote Carriker (1910, p. 542): "It is a bird of the forest, but also frequents open woodland, scattering trees in pastures, etc., and I do not think it would be found in dense unbroken forest far from any clearing." The White-throated species, on the other hand, "is strictly an inhabitant of forests, seldom, if ever, leaving the cool dark depths of the moisture-laden jungles of that region [above Ujurrás de Térraba]" (p. 541). Hence the White-throated may have been a montane inhabitant of the forested southwest, including the Dota region, whence it spread northward to the southern border of the central plateau.

Slight introgression attends the meeting of the gray-tailed White-throated and blackish-

tailed Purple-throated forms along this border. Here the majority of the Purple-throated have the under side of the tail paler, or brownish. Many specimens of the White-throated, throughout the area of overlap, show at least a trace of lilac tipping along the edge of the white throat patch. Nevertheless, the Purple-throated and the White-throated, with rare exception, hold true to type, that is, they resemble definitely one or the other.

The few exceptions could perhaps qualify as first-generation hybrids. Berlioz (1949, p. 5) recorded from Estrella de Cartago a blackish-tailed White-throated specimen like the birds of the Chiriquí race, *castaneoventris*, while a second specimen is like the Purple-throated species, except its throat patch consists of white feathers each narrowly tipped with metallic lilac. I find another specimen (A.M.N.H. No. 482566), similar to the last, from the Dota region, with the under side of the tail dark (not blackish) and the throat white, with a broad sprinkling of lilac-tipped feathers along the border. On Chiriquí Volcano, where sympatric with the Purple-throated species, the majority of the race *castaneoventris* have a few lilac-tipped feathers along the edge of the throat patch.

***Heliodoxa jacula* Gould**

GREEN-CROWNED BRILLIANT

RANGE: Costa Rica to western Ecuador.

***Heliodoxa jacula henryi* Lawrence**

RANGE: Costa Rica and western Panama.

The Green-crowned Brilliant is most common on that portion of the Caribbean versant that extends from the northern face of the Cordillera Central to the Reventazón watershed. Westward from Poás Volcano it occurs in the Aguacate Mountains and northward in the upper San Carlos region, but there is no record from the northwestern cordilleras proper. A report by Zeledón from "Talamanca" is referable to the Caribbean slope of the Talamanca Cordillera, the length of which the bird probably occurs. Apparently the species is scarce in the southwest, where it is recorded sparingly from the Dota and General regions. It is rare, perhaps a wanderer, on the central plateau.

Vertically it is distributed primarily from

somewhat below the middle of the subtropical belt to the lower portion of the lower montane belt. Locally it may descend steep slopes and cloud-forested pockets to the lower limit of the subtropical belt and rises regularly higher in the lower montane belt, irregularly above its upper limits. Inhabiting wooded regions for the most part, it is apt to be met where these have been partially cleared, whether for agriculture or dairy pasture, as well as at woodland borders and in open woods.

A fairly common bird met more or less regularly, it generally keeps at approximately shrub height or lower. In common with other larger-sized hummingbirds, it beats its wings slowly compared with medium-sized species. When feeding, it may probe the corollas while comfortably perched beside the flower. This the bird does often enough for it to be perhaps a distinguishing mannerism. The only note that I am able to assign to the species is an almost inaudible "tip."

Eugenes fulgens (Swainson)

RIVOLI'S HUMMINGBIRD

RANGE: Southwestern United States to western Panama.

Eugenes fulgens spectabilis (Lawrence)

RANGE: Costa Rica and western Panama.

The distributional center for Rivoli's Hummingbird is the high mountains, from timber line down to about 7000 feet. Lower it is local and uncommon, perhaps seasonal, or lacking; it is not known below approximately the 5000-foot mark. Most reports stem from the central highlands, especially the Cordillera Central, where the bird is abundant, apparently more so than along the Talamanca Cordillera. Though not recorded from the Dota Mountains, it is undoubtedly present, probably in good numbers. As it is not known from the northwestern divide, the Costa Rican population is separated by a considerable gap from the one in the mountains northward from northern Nicaragua.

Together with *Panterpe insignis*, *Colibri thalassinus*, and *Selasphorus flammula*, this large hummingbird is one of the typical inhabitants of the cloud-forested cold highlands. It is partial to parklike pastures, forest borders, breaks in woodland, and thinned

woods. It is scarce inside forest, whether with or without an impenetrable understory of canelike bamboo. Probably with the accelerating destruction of forest on the Talamanca Range it will become as common there as on the large central volcanoes. The bird usually perches and forages fairly low in shrubby or thickety growth mixed with trees, where its white postocular spot resembles a staring eye.

Heliothryx barroti (Bourcier)

BARROT'S FAIRY

RANGE: Southern Mexico to western Ecuador.

Barrot's Fairy is distributed over the humid life zones mostly at low elevations on both slopes. It is present throughout the wooded lowlands and occurs locally and in diminishing numbers in the subtropical belt to its upper limits on the Caribbean slope but is uncommon even in the lower portion of the belt in the southwest. On the northwestern divide it seems to be known from but one locality, where I found it in the wet-forested hills that overlook Lake Arenal. It is quite absent from the Tropical Dry Forest and the central plateau despite a report from "San José." Though widely dispersed in almost every suitable locality, this hummingbird is seen singly and irregularly and is not common at any one place.

It occurs as a rule in wooded regions, sometimes in the interior of virgin forest, but prefers the borders of forest, forest-enclosed streams and pools, shaded cacao plantations at the lower elevations, or coffee plantations and pastures with shade trees and shrubbery higher up. Usually it keeps well above shrub height outside woodland and rather high to very high in forest, hovering before vines and foliage. Sometimes it visits flowering shrubbery along forest borders in the same way that it goes down to drink from a pool in forest.

Compared to the general run of hummingbirds, this is a relatively short-billed, long-tailed species that, hovering with slower fluttery beats and much movement of the white-flashing tail, brings to mind a katydid both when maneuvering in the air and in coursing flight. It may hover with its body arched horizontally, its head raised, and its

tail flicking upward, or hang perpendicularly, often with its tail extended back horizontally. I have seen the bird weaving about in the air, repeatedly stabbing its tongue at a small insect that kept getting away. The only sort of sound that I heard was a weak "tsir," "tsp," or "tsup."

***Heliomaster constantii* (DeLattre)**

CONSTANT'S STARThROAT

RANGE: Western Mexico to Costa Rica.

***Heliomaster constantii constantii* (DeLattre)**

RANGE: El Salvador to Costa Rica.

Constant's Starthroat is a member of the arid Pacific avifauna that reaches its southern limit in Costa Rica. Its distribution here in the Pacific northwest conforms to expectations, but the species is also found in the southwest. Its center of abundance is in the Tropical Dry Forest, especially the Tempisque basin. It spreads up the slopes of the northwestern divide and in diminishing numbers crosses the central plateau, on which it is common locally or maybe seasonally, barely to reach the Caribbean side. An old record from "Angostura" at an elevation of 2000 feet on the lower Caribbean slope is perhaps an error. The bird occurs sparingly in the General-Térraba region, mostly in scrubby or partially cleared country in the upper tropical and lower subtropical belts. The gap between the two centers is probably not real.

Though sympatric with the congeneric *longirostris* over a good part of its range, Constant's is most plentiful where *longirostris* is least abundant, and vice versa. It inhabits the scrubby cattle country, agricultural lands, and, on the central plateau, the pastures and coffee fincas; in the southwest, its habitat is similar. It also occurs along woodland borders but not inside forest. Its habits seem not to differ from those of *longirostris*.

***Heliomaster longirostris* (Audebert and Vieillot)**

LONG-BILLED STARThROAT

RANGE: Southern Mexico to northern Brazil, Mato Grosso, and Bolivia.

***Heliomaster longirostris longirostris*
(Audebert and Vieillot)**

RANGE: Same as above, excluding western Ecuador and northwestern Peru.

The species is most common in the humid life zones on both slopes and, except locally in the vicinity of the Gulf of Nicoya, rare to lacking in the dry-forested northwest. It occurs over much of the tropical belt and, especially on the Caribbean slope, locally well into the subtropical belt and even to the lower montane belt. It seems to be considerably less common than *constantii* on the central plateau, where it is not recorded west of the vicinity of San José and, like *constantii*, is perhaps only seasonal. Far more abundant than *constantii* in the southern half of the Pacific side, it occurs from the lowlands to, locally, the middle of the subtropical belt. Neither species has been reported from the wet-forested Golfo Dulce lowlands.

Like *constantii* it does not inhabit shaded woodland, preferring plantations, clearings and pastures with trees, and woodland borders. It is distinctly uncommon even in suitable habitat in extensively forested regions. Nowhere in the country is it seen in numbers. At best, a few scattered individuals may frequent a particular site. Usually it keeps from medium heights to high in the trees, though sometimes descending to shrubs and bushy low growth, and it habitually perches on or near the tips of bare twigs. Frequently it performs a dancing hover when preying on tiny insects in the air.

***Philodice bryantae* (Lawrence)**

COSTA RICAN WOOD STAR

RANGE: Costa Rica and western Panama.

This very uncommon species has been recorded mostly from the vicinity of San José. There, on the heavily populated, largely deforested central plateau, the bird is most likely a seasonal visitant. According to Carriker (1910, p. 546), it ranges "over the higher portions of the plateau region, and up the volcanoes to almost timber-line. It is most abundant, however, from about 4,000 to 6,000 feet, frequenting shrubbery, the edges of forests, bushy pastures, and roadsides, and usually keeps near the ground." From the plateau region its distribution continues eastward to the upper Reventazón Valley and southward, probably continuously, to the Dota Mountains. Elsewhere it has been taken only at Cerro Santa María in the Guanacaste Cordillera, where I also found it in shrubs and

the lower branches of trees in humid woodland somewhat opened by man.

[*Tilmatura dupontii* (Lesson)]

DUPONT'S HUMMINGBIRD

RANGE: Central Mexico to northern Nicaragua; recorded in Costa Rica.

Two uncatalogued specimens of Costa Rican provenance in the collection of the Museo Nacional in San José, brought to my attention by Sr. Alfonso Jiménez of that institution, are the only ones known. One is a male, the other a female, collected in May, 1938, and June 20, 1938, respectively, by C. F. Underwood, according to the labels, at Peralta, a village at an altitude of 1200 feet in the Reventazón Valley. Though the information on the labels cannot be gainsaid, I strongly suspect that Underwood collected the birds in Honduras or Guatemala and attached Costa Rican labels by mistake. In my opinion the species should not be admitted to the Costa Rican list.]

***Archilochus colubris* (Linnaeus)**

RUBY-THROATED HUMMINGBIRD

RANGE: Breeds in eastern North America; winters from southern Mexico to Panama; casual in West Indies.

The Ruby-throated, the only migrant hummingbird in the country, arrives, as suggested by Carriker (1910, p. 546), probably in October and departs by the end of March or early April. It winters almost exclusively on the Pacific slope, mostly in the Tropical Dry Forest. It rises on the lower slopes of the Guanacaste Cordillera and, in constantly diminishing numbers, reaches the central plateau. There is even a record (Juan Viñas) for the upper Reventazón Valley on the Caribbean slope. The bird winters also in the southwest, where I found it locally common in the Térraba region in January.

The winter habitat of the bird in Costa Rica may surprise the observer acquainted with the Ruby-throat in eastern North America in summer. Thus, the bird is common in the scrubby Guanacaste cattle country during the dry season, less common on the more humid slopes of the northwestern divide. In the southwest, too, it is present in thickety, bushy fields and openings as well

as a savanna type of country in the dry season. As a rule it keeps low in shrubs and thickety ground cover. I saw a full-gorgeted male rarely.

***Selasphorus flammula* Salvin**

VOLCANO HUMMINGBIRD

RANGE: Costa Rica and western Panama.

The species is evidently polymorphic, as "*torridus*" and typical *flammula* coexist in central Costa Rica. Only "*torridus*" is present on Chiriquí Volcano in Panama, but there the gorget is so variable in color that certain individuals suggest *flammula* (Berlioz, 1949, p. 6). In Costa Rica "*torridus*" usefully signifies this color variant.

The well-named Volcano Hummingbird is nearly confined to the high mountains of Costa Rica from the central highlands southward through the Dota Mountains to the northern sector of the Talamanca Cordillera. Though unrecorded farther south, it undoubtedly continues to Panama. Its center of abundance is in the montane belt to above timber line. I found it plentiful on the cold and mist-driven treeless summit of Cerro de la Muerte and inside the crater of Turrialba Volcano. Below the upper portion of the lower montane belt it becomes scarce, yet it has been collected in the upper subtropical belt.

This tiny species is especially numerous in the parklike highland pastures and along the borders of woods, where there is always a profusion of flowers; its forehead is frequently discolored with pollen. Keeping to bushy growth and the lower branches of small trees, it perches conspicuously on twigs. Ordinarily it hovers horizontally, with head and tail arched upward. In August and February I have seen presumably courting males rise high in the air, then plummet earthward to a perch. The species makes a reedy nasal "titting."

***Selasphorus simoni* Carriker**

SIMON'S HUMMINGBIRD

RANGE: Costa Rica.

Simon's Hummingbird differs from the very similar *ardens* of western Panama in color characters, not in bill and wing measurements or length of under tail coverts as diagnosed by Carriker (1910, p. 550). In

Costa Rica its isolated range suggests an endemic possibly no more than subspecifically distinct from *ardens*. It is restricted, so far as known, to the central highlands: the Cordillera Central and the mountains that border the central plateau on the south. It has been taken several times on Barba and Poás volcanoes, not at all on the Irazú-Turrialba massif. Neither is it known from the Dota Mountains or the Talamanca Cordillera. As noted by Carriker (*ibid.*, p. 551), "its altitudinal range seems to be the same as that of *S. flammula*, or perhaps a trifle lower." (*Selasphorus ardens* in Panama apparently occurs at considerably lower elevations.) As *simoni* and the congeneric *flammula* appear to be partly sympatric, possibly the center of abundance of *simoni* is indeed a little lower than and complementary to that of the montane-belt *flammula*.

***Selasphorus scintilla* (Gould)**

SCINTILLANT HUMMINGBIRD

RANGE: Costa Rica and western Panama.

Unlike the two preceding members of its genus, the Scintillant Hummingbird is primarily an inhabitant of the middle altitudes, from the middle of the subtropical belt through the lower montane belt, rising here and there a little higher or descending a little lower. It is known mostly from the central highlands, including both sides of the Cordillera Central, the mountains along the southern edge of the central plateau, the Dota region, and the very humid Caribbean foothills and slopes that rise toward the plateau region and the northern end of the Talamanca Cordillera. It has also been recorded from the Talamanca Range in the southwest, not as yet from the southeast.

It occurs both in heavily wet-forested precipitous areas and semi-open situations. As stated by Carriker (1910, p. 549), it is "found almost everywhere over the central plateau above 3,500 or 4,000 feet," and "its habits are about the same [as those of *S. flammula*], keeping in the low trees and shrubbery, buzzing about like a big bumblebee, and darting from one flower to another; and, when tired, perching on a tiny twig in the same bush with the flowers upon which they are feeding, or

near by it." I have even seen it resting on flat leaves.

FAMILY TROGONIDAE

***Pharomachrus mocinno* De la Llave**

QUETZAL

RANGE: Southern Mexico to western Panama.

***Pharomachrus mocinno costaricensis* Cabanis**

RANGE: Costa Rica and western Panama.

The Quetzal is known mostly from the central highlands: the Cordillera Central to the northern sector of the Talamanca Cordillera and the mountainous country in Cartago Province. Though not recorded southward along the Talamanca Range, it surely occurs continuously to Panama. In addition, I found it at one locality on the Cordillera de Tilarán, where it was very uncommon; there is no report from the Guanacaste Cordillera. Vertically it ranges from the upper subtropical belt to timber line; occasionally it descends somewhat below 4000 feet, rarely to 3000 feet, under suitable cloud-forest conditions. It is one of the characteristic birds of the montane belt, where it is the only member of its family.

Virtually restricted to the cool and misty mountain forests, the species is still common in the wilder areas. It performs a seasonal migration to and from the high altitudes at which apparently a considerable proportion of the population breeds. From time to time the bird enters parklike pastures or other tree-scattered openings, usually away from habitations, and frequents forested precipitous slopes, rifts, and borders of chasms. Generally it keeps well up in densely foliated trees, sometimes much lower on an exposed branch in the semi-open or in open woodland; yet I met several birds, possibly a family group, below medium heights in a patch of dense woodland. A bird in the open, by the way, can appear to be blue instead of green. Its habit of plucking fruit from a hover, its headlong bounding flight, and its custom of perching "stupidly" are all trogon-like. Its most characteristic sound is a galline cackle, not unlike that of *Trogon bairdii*. (For an ex-

cellent study of the Quetzal in Costa Rica, see Skutch, 1944b.)

Trogon massena Gould

MASSENA TROGON

RANGE: Southern Mexico to northwestern Ecuador.

Trogon massena massena Gould

RANGE: Southern Mexico to extreme northwestern Colombia.

The Massena Trogon is widely distributed over both slopes, primarily in the humid life zones, from the lowlands to about the middle of the subtropical belt, locally somewhat higher. It is absent from most of the Tropical Dry Forest, though not uncommon but of spotty occurrence in wooded portions of the lower Tempisque basin. From the Caribbean side it overlaps the forested lower slopes on the Pacific face of the Guanacaste Cordillera. It has not yet been recorded from the Cordillera de Tilarán. On the Pacific side its numbers suddenly increase southward from the Río Grande de Tárcos through the humid-forested southwest.

A forest-based species most common in the tropical belt, it spreads regularly to the neighboring semi-open; I found it also in mangroves. Usually it perches upward from medium heights; in forest it regularly rises high in tall trees. Yet it may excavate its breeding cavity in a termite nest no more than 10 feet up in the semi-open. It occurs alone, in somewhat separated two's, usually a pair, and sometimes in three's or four's. It exhibits the usual trogon traits of sitting "stupidly," thus permitting a close approach, and of plucking food from a spectacular hover. A large trogon, it flies in hurtling dips, usually for a short distance, before coming lightly to rest.

Both sexes take part in the following, probably courtship, behavior while perched. The male, raising his tail in conjunction with a jerky bow or a dovelike nod, conspicuously exposes his red crissum below and green rump and tail coverts, now fluffed, above. The female also raises her tail and, holding it so a moment or two, exposes her fluffed red crissum, but she apparently does not jerk or nod. Neither sex spreads the tail. (See *T. clathratus*.) The two may draw near each other, per-

haps on a slender branch bare but for clustered dead leaves, and, usually keeping their backs turned, continually raise and lower their tails while uttering a churring chuckle.

The usual call of up to 10 or more "poop"'s or "kuk"'s differs perceptibly from that of the sympatric, similar-plumaged congeners, *clathratus* on the Caribbean side and *bairdii* in the southwest. Also, after a level beginning it may descend with a change in quality, or it may be shortened and accelerated. Another variation sounds like a long series of nasal barks. The bird iterates a single "cooer" or "err" at short intervals and repeats a nasal "huh" or "anh," similar to those of the forest falcon *Micrastur ruficollis* and the oropendola *Gymnostinops montezuma*.

The race *T. m. hoffmanni* (Cabanis and Heine), described for Costa Rica and Panama on the clinal basis of larger average size, Zimmer (1948, p. 45) was unable to distinguish with any certainty, yet he hesitated to deny its validity. I follow Ridgway [1911 (1901-1950), pt. 5, p. 744] and Todd (1943, p. 5), who did not recognize it.

Trogon clathratus Salvin

LATTICE-TAILED TROGON

RANGE: Costa Rica and western Panama.

The Lattice-tailed Trogon is a Caribbean species distributed from the northwestern divide to Panama and from the lower tropical belt up to at least 4500 feet, with its center of abundance following the foothills and slopes of the cordilleran core of the country. Probably it reaches the lowlands in many places along the fringing foothills. At any rate, I found it not uncommon under these circumstances in the Sarapiquí region. It is completely sympatric with the wide-ranging, very similar, congeneric *massena*. Unlike the plentiful *massena*, it is seen seldom, if at all, in most places during a short visit.

This trogon is found almost exclusively in heavily wooded areas. It is a true forest inhabitant that occurs only occasionally at the forest border or beside it in the shaded semi-open, unlike the broadly tolerant *massena*, and is met singly or as a somewhat separated member of a pair. Its habits appear indistinguishable from those of *massena* in most

respects. Vocally, too, it resembles *massena*. Its usual call differs in being higher pitched, its "poop"'s fewer in number than the "kuk"'s or barking notes of *massena*, and in going downscale from a light quality to the heavy one of *massena*; also, the first two notes trend upward. It makes another, stronger call, similar in quality to that of *massena*, that bulges in the middle portion. I would have expected sympatric species so much alike to have very different voices. Instead, a visual barrier seems to be afforded by the color of the soft parts: orange beak and orange eye ring in *massena*, yellow beak and white eye (no eye ring) in *clathratus*, and by tail pattern: plain in *massena*, barred outer rectrices in *clathratus*.

The courting behavior is much like that of *massena*. Both sexes accompany the tail-raising with either a liquid gurgle or a churring chuckle, the latter differing from that of *massena* in its somewhat higher pitch and slightly "yacking" quality. Significantly, the latticed outer tail feathers play a part in display. Ordinarily these rectrices are hidden when viewed from behind. But when the male is calling in the presence of a female, they project laterally outward from the rest of the tail or they lie out of sequence, overlapping instead of being overlapped by the green middle rectrices.

Trogon bairdii Lawrence

BAIRD'S TROGON

RANGE: Pacific slope of southern Costa Rica and western Panama.

In the absence of contrary evidence I prefer to consider the reddish-bellied Baird's Trogon specifically distinct from the yellow-bellied *viridis* complex that extends from west-central Panama to Peru and southeastern Brazil. In Costa Rica, Baird's is virtually confined to the humid Pacific southwest, except for a slight invasion of the transition with the Tropical Dry Forest northward to and somewhat beyond the Río Grande de Tárcoles. Vertically, it ranges from the lowlands to the lower subtropical belt, where it is locally common on the slopes and spurs of the Talamanca Cordillera in the far southwest. Northward, however, it is not known above the tropical belt and does not rise to the central plateau. Deignan (1961,

pp. 189-190) corrected the type locality from San Mateo, on the Pacific slope, to Turrialba, on the Caribbean slope. Personally, I would as soon expect Baird's Trogon at Turrialba as living wild in Washington, D. C. Deignan's supposed correction allots this trogon its only Caribbean record.

Baird's is completely sympatric with *massena*, the two being found commonly together in some places, uncommonly in others. Like *massena*, it is a forest inhabitant that also enters the neighboring well-shaded semi-open. It frequents all vegetation levels above shrub height and even descends to eye level. Unusually among Costa Rican trogons, it occurs in small groups more often than singly or in two's. It differs in color of plumage and soft parts but resembles *massena* in voice. Its call, consisting of a number of "chowp"'s, starts slowly, like that of *massena*, then speeds up and bounces along with increasing strength and ends by slowing and dropping in pitch. Another, similar cry, not unlike that of the Quetzal, is a rapid, chicken-like cackle, higher in the middle portion; the bird also makes a weak cackle more like that of other trogons. Another call is a dovelike, soft "coo-coo-coo-coo-coo." Also given are a "chowp" (or "chuck," "kuk," or "cop") in two-note or three-note sets, accompanied by a quick, "nervous," white-revealing spread of the tail, and an iterated characterless "chup."

Trogon melanocephalus Gould

BLACK-HEADED TROGON

RANGE: Mexico to Costa Rica.

Trogon melanocephalus melanocephalus Gould

RANGE: Eastern Mexico to northern Caribbean Costa Rica.

Trogon melanocephalus illaetabilis Bangs

RANGE: Northwestern Costa Rica.

The Black-headed Trogon is probably specifically distinct from *citreolus*, with which it is now usually united. Ridgway [1911 (1901-1950), pt. 5, p. 759] described the differences in plumage, and I am impressed by the differently colored orbital regions of the two birds, so conspicuous in life, and the difference in voice (see Skutch, 1948a, p. 138; Zimmerman and Harry, 1951, p. 307).

The race *melanocephalus* of eastern Mexico and Caribbean Central America reaches southeastern Nicaragua and is common locally in the Río Frío region of the north-western Caribbean lowlands of Costa Rica. The population that inhabits the Pacific slope is represented clinally by the poorly marked *illaetabilis*, the common trogon of the Tropical Dry Forest, which rises with the cattle lands to the transition with the Caribbean-influenced humid forests overlapping the Guanacaste Cordillera. It does not reach the central plateau or even its western approach. The two races intergrade at the Guanacaste Cordillera and over the northern two-thirds of Guanacaste Province. Sassi (1939, p. 155) thought that the difference between the two forms could be noticeable only in large series. Rendahl (1918-1920, p. 20) was "inclined to think, that the southern birds certainly show a tendency to a larger size and a more slaty colour of head, throat and chest than the northern ones, but that it is impossible to determine a distinct limit between them, because they blend into each other." In my opinion, *melanocephalus* genes predominate. Blackish and slaty individuals have been taken at the same localities both in Pacific Costa Rica and in Nicaragua. A number of Costa Rican birds from the range of *illaetabilis*, whether blackish or slaty, can be matched by specimens, say, from Honduras.

A nonforest species, this trogon prefers scrubby cattle country, bushy and shrubby portions of agricultural lands, and thinned or second-growth woodland with bushy and thickety openings. Usually it keeps fairly low, though calling birds may rise into the crowns of the trees. Sometimes it is not particularly shy; at other times it is very wary. Apparently it nests, at least in part, as do some other trogons, in a hole that it excavates in a hard termite nest, which is often a conspicuous object in the scrubby environments. Its individually variable call is quite different from that of any other Costa Rican trogon. Thus, often consisting of a series of accelerating throaty chucks, it is similar to, though lacking the terminal slur of, that of the antshrike *Thamnophilus doliatus*. It may change midway to a higher or lower pitch, or rise at the end, or descend somewhat and finish as a harsh cackling, or take the form of

an accelerating tattoo, or become a rather musical, descending cackle; it may begin with a soft "oh, chochocho." Either sex calls singly, and both may call back and forth to each other. Also uttered are a low, querulous "onk-onk-onk-onk-onk," a soft short "choop," and single sharp "kop"'s to which the tail jerks in time.

Trogon elegans Gould

ELEGANT TROGON

RANGE: Southwestern United States to Costa Rica.

Trogon elegans lubricus Peters

RANGE: Western Nicaragua and north-western Costa Rica.

The Elegant Trogon is another member of the arid Pacific avifauna the southern terminus of which is the Pacific northwest of Costa Rica. Here it is virtually restricted to the Tropical Dry Forest over the northern two-thirds of Guanacaste Province, including the lower slopes of the Guanacaste Cordillera. Although recorded from the island of San Lucas within sight of the port of Puntarenas, it is not yet known on the mainland south of the head of the Gulf of Nicoya.

The species is almost if not entirely sympatric with the more abundant *melanocephalus*, from which it is distinct in color, pattern, voice, and habitat. It is found in heavy woods, whether stands or stream-bordering galleries scattered over lowland Guanacaste, or the edaphically moist forests which during the height of the dry season look out of place on hilly terrain in the Nicoya Peninsula. Although encountered, on the whole, irregularly, it may be quite common locally. In leafy woods it brings to mind a misplaced *colaris* of the cool and wet subtropical belt, so closely does it resemble the latter species. Like most of its family, it exhibits an exaggerated tail lifting, and it takes small fruits on the wing.

Vocally it is unique among Costa Rican trogons. Its hoarse, rather long "raow" could be mistaken for the cry of some four-footed animal. In series it suggests the barking grunts of a tiger bittern (*Tigrisoma mexicanum*). I have also transcribed it as consisting of several (three to seven) very peculiar, very deep, hoarse, bullfrog-like "dýur"'s

which at a distance sound like a guttural "uhr uhr," and so on, or the sawing of wood. Another cry, repeated once or twice, is a sort of "cooěék."

***Trogon collaris* Vieillot**

COLLARED TROGON

RANGE: Southern Mexico to Bolivia and southeastern Brazil.

***Trogon collaris puella* Gould**

RANGE: Southern Mexico to western Panama.

The Collared Trogon inhabits the cool and very humid middle altitudes in the mountainous central and southern parts of the country. Most records stem from the central highlands, primarily their Caribbean versant, as well as the mountains along the southern edge of the central plateau and in the Dota region. A record from San Mateo, at the foot of the Aguacate Mountains, probably applies to the latter as the actual site of collection. The species is present along both slopes of the Talamanca Cordillera, on the Pacific face of which, and probably also the Caribbean, it is locally if not generally abundant, to Panama. It is absent from the northwestern divide. Its center of distribution follows the upper half or two-thirds of the subtropical belt and the lower half of the lower montane belt, from which the species rises not uncommonly to the montane belt and descends to the lower limits of the subtropical belt in suitable cool and wet pockets. It is rare, probably accidental, in the tropical belt, whence recorded only twice in the northeastern sector (near Guápiles and near Puerto Viejo). Though it has been taken as low as 2000 feet at El General in the southwest, Skutch (1959c, p. 6), who resides in the area, encountered it upward from 3000 feet.

The Collared is primarily an inhabitant of forest, which in broken, hilly terrain varies considerably in height and density and is continually interrupted so that edges abound. In this sense the bird is seen most frequently along the edges of forest, and it also enters a little into the semi-open, generally where there are tall trees. It occurs singly, in pairs, sometimes in small groups, usually in the arboreal foliage. Its style of courtship, described by Crandall (1914, p. 333), seems to be similar to

that of *massena*. Its typical call is a deliberate "caow caow" (or "chowp chowp"); the note may also be given three times or singly. The bird utters several low "caow" 's or "coo" 's in descending order that weaken progressively in a conversational manner. A variant of the last is a sort of descending laugh, "wo ho hò hò hò." Given commonly are a fine "ch·r·r·r·r" or "charr," such as expected from an antbird, and a snorting "chrrp," suggesting the ovenbird *Automolus ochrolaemus* or the flycatcher *Megarhynchus*. Several of the above cries as well as others not mentioned are accompanied by a raising and lowering of the tail.

***Trogon aurantiiventris* Gould**

ORANGE-BELLIED TROGON

RANGE: Costa Rica and western Panama.

***Trogon aurantiiventris underwoodi* Bangs**

RANGE: Northern Costa Rica.

***Trogon aurantiiventris aurantiiventris* Gould**

RANGE: Central Costa Rica to western Panama.

Little is known about the Orange-bellied Trogon. In Costa Rica it seems to be restricted to the lower middle altitudes in the northern and central parts of the country. The race *underwoodi* is distributed along the Pacific, probably also the Caribbean, slope of the northwestern divide, in the Aguacate Mountains, and on the north slope of the Cordillera Central from the western base of Poás Volcano to the depression between Barba and Irazú volcanoes. Vertically it ranges from the lower limits of the subtropical belt into the lower montane belt. The race *aurantiiventris* is known from the eastern side of the central highlands, that is, the southern slope of Irazú Volcano and the vicinity of Cartago, and again in the Dota region. It seems not to have been recorded from the Talamanca Cordillera, where it is probably distributed continuously, perhaps along both slopes, into Panama. The two races probably meet somewhere along the slopes of the Cordillera Central.

The center of abundance of *underwoodi* apparently lies along the northwestern divide, from which the very similar *T. collaris* is not known. But on the Cordillera Central, where

underwoodi becomes scarce, the sympatric *T. collaris* is very common. On the other hand, the more orange-bellied race, *aurantiiventris*, is everywhere sympatric with *T. collaris*. The Orange-bellied Trogon, localized in southern Central America, would appear to be an offshoot of the widely distributed *T. collaris*. Aside from the difference in color or shade of the belly, the two species are virtually identical in habitat, habits, and voice. Every call that I have heard from *collaris* is matched by one of *aurantiiventris*.

Trogon rufus Gmelin

GRACEFUL TROGON

RANGE: Honduras to the Guianas, Peru, and extreme northeastern Argentina.

Trogon rufus tenellus Cabanis

RANGE: Honduras to extreme northwestern Colombia.

The distribution of the Graceful Trogon, primarily at the lower elevations in the humid life zones, is virtually country-wide. The species is not uncommon within the lower limits of the subtropical belt but becomes rare above 3000 feet, yet it has been taken at an elevation of 4500 feet. It is rare or local in most of the Tropical Dry Forest, where it has been recorded in Guanacaste Province only at the head of the Gulf of Nicoya. Southward from the Puntarenas-Barranca district, it becomes increasingly common through the transition to the humid southwest. It is present in fair numbers at upper tropical and lower subtropical elevations along the Pacific face of the Guanacaste Cordillera, which it has undoubtedly reached through gaps from the Caribbean side.

This woodland-inhabiting trogon is found in virgin forest and, occasionally, in forest-bordering advanced second growth (subforest). It is the only yellow-bellied trogon in tall forest. It will probably never be seen high in the trees but upon the lower branches or in the understory. Its everyday habits appear no different from those of its congeners. Usually it sits about "stupidly." It is generally seen alone, perhaps as one of a somewhat separated pair, and it may be approached rather closely. Sallying for food, it snatches tree-hung fruits or animal prey while hovering at the foliage.

Its call consists of two to five deliberate, equally spaced, "whistled" notes, sounding like "aow," "owp," "pow," or sometimes "poo," given in slightly descending order. In quality and pattern it is similar to that of the antbirds *Myrmeciza exsul* and *Formicarius analis*, species with which this trogon is usually found together, but it differs in lacking any special emphasis. Not only the quality but also the marked deliberateness and slight descent of the sequence distinguish this call from the similar ones of the congeneric *collaris* and *aurantiiventris*. A typically trogon-like cackle of decreasing intensity, softened at times to a gargle or warble and sometimes preceded by a "chikikikik," sounds frightened. An excited-sounding "chikarikarik," similar to the last, is generally given as the bird flutters to another branch. Its cackling churr, as in other species, is accompanied by a slow raising of the tail to perhaps higher than the head when the cry begins and a faster lowering as it ends.

Trogon violaceus Gmelin

GARTERED TROGON

RANGE: Southern Mexico to Peru and Brazil.

Trogon violaceus concinnus Lawrence

RANGE: Costa Rica to western Ecuador.

The Gartered, the most commonly seen trogon in Costa Rica, is distributed along both slopes from the lowlands locally well into the subtropical belt and sparsely over the central plateau. It is most common on the Caribbean side, from which it overlaps the Pacific face of the Guanacaste Cordillera. On the Pacific side it is relatively uncommon in the humid-forested southern half. It is local but not rare at the head and along both sides of the Gulf of Nicoya; it is mostly absent from the northern half of dry-forested Guanacaste. Its geographic range, on the whole, parallels that of the congeneric *rufus* and partially coincides with that of *melanocephalus* in the northwest.

A nonforest trogon, its occurrence is governed by the presence of suitable habitat. It is found most frequently along forest borders, in thinned woodland, second growth with emergent trees, and, especially, shaded plantations and openings with shrubs and

trees. It barely enters the heavy woods favored by the ecologically distinct *rufus*. Usually it occurs from somewhat below medium heights to fairly high in the trees. As with most trogons, it is seen singly or as a separated pair. Often it sits "stupidly," an easy mark for a stick or a stone. It may even dash into foliage just above the observer's head. Occasionally it sallies for fruits or perhaps an insect as large as a katydid, always taken during a spread-tailed hover. I have also seen the Gartered perched near a wasp nest, frequently sallying to seize the insects on the wing. Skutch (1956, p. 357) reported this species as nesting, apparently regularly, in the heart of a wasp nest.

Its call is a consecutively repeated "hoop," "poo," "chow," or "chyow" that accelerates a little and finishes with slightly increasing intensity. Sometimes it almost becomes a cackle. Though resembling the calls of *mas-sena*, *clathratus*, and *bairdii*, it is higher-keyed, lighter in quality, and neither drops in pitch nor slows at the end. The bird also utters, rather slowly, a cooing cackle, not unlike that of several other trogons, and a liquid churr accompanied by a slow raising of its tail and perhaps a nodding of its head.

FAMILY ALCEDINIDAE

Megaceryle torquata (Linnaeus)

RINGED KINGFISHER

RANGE: Northern Mexico to Tierra del Fuego; Lesser Antilles.

Megaceryle torquata torquata (Linnaeus)

RANGE: Northern Mexico to Bolivia and northern Argentina.

The very large Ringed Kingfisher is widely distributed along both slopes from the lowlands, where it is most abundant, locally to upper subtropical elevations along the larger river valleys. It is fairly common in the Tempisque basin and has been recorded northward to Liberia in the Tropical Dry Forest. It is not known, however, from the central plateau or the northwestern divide. An inhabitant of rivers, streams, and coastal lagoons, it is apt to be present in suitable habitat almost anywhere, whether a river in wet forest or an open-country watercourse. But it does not occur at streams closed to the

sky by forest and generally does not frequent lakes or ponds.

Unlike other Costa Rican kingfishers, except occasionally the Amazon, this species regularly flies high overland. I have even seen it passing above a wooded swamp inside forest. Just before dusk it may fly the same cross-country route daily either at the same time or at equivalent intensities of light, as though homing to roost by the most direct path from another part of the river. Also, it often perches on a high bare branch in the semi-open a little distance from a watercourse.

Appearing surprisingly slender in high flight, the bird breaks the evenness of its wing beats every two or three strokes and utters repeatedly a scratchy "kerrék." Along a watercourse, it perches usually fairly low on the tree-lined banks, and there it occurs in two's or three's as well as singly. As do the other kingfishers, the perched bird raises and lowers its tail more or less regularly, at the same time stretching and retracting its neck. It makes a strong, even rattle of some 10 syllables accompanied by a vibrating of the tail, also a rapping "kik·kik," and so on. The perching on a high branch together with the exaggerated tail-raising and reiterated rattling may serve to attract a mate, as suggested by Sassi (1939, p. 157).

Megaceryle alcyon (Linnaeus)

BELTED KINGFISHER

RANGE: Breeds in North America; winters to Panama and north coast of South America, also in West Indies.

Megaceryle alcyon alcyon (Linnaeus)

RANGE: Breeds in North America east of Rocky Mountains; winters to eastern Panama and West Indies, recorded in Colombia and north coast of South America to Trinidad.

The migrant Belted Kingfisher arrives by the middle of September, perhaps earlier, and remains until May. Most published records are old and stem from the central plateau: the headwaters of the Río Reventazón in the vicinity of Cartago, also at or near San José. Elsewhere it has been found at Bebedero in Guanacaste, San Lucas Island in the Gulf of Nicoya, and the Río Frío region. I met it at six localities: beside the Reventazón Valley

close to Turrialba, near the coast in the Sixaola region, Río Cañas near Santa Cruz de Nicoya, midway along the Pacific coast near Parrita, the head of the Golfo Dulce, and the Río Frío region. The species seems to be a regular visitor only in the open Río Frío region and the mangrove-lined Pacific estuaries. Usually it is seen singly, but a few individuals may be dispersed at an especially favorable site. Acting here as it does in the north, it courses about with fluttering beats and, in contrast to the native kingfishers, hovers habitually.

***Chloroceryle amazona* (Latham)**

AMAZON KINGFISHER

RANGE: Southern Mexico to Peru and north-central Argentina.

***Chloroceryle amazona mexicana* Brodkorb**

RANGE: Southern Mexico to eastern Panama.

The Amazon Kingfisher is widespread both in the humid and subhumid life zones, especially in the lower tropical belt. It rises and undoubtedly breeds to the lower limits of the subtropical belt in the General-Térraba drainage, the headwaters of the Río Reventazón, perhaps also in the Sixaola watershed. There is no record from the northwestern divide or the central plateau proper. Almost everywhere it is sympatric and ecologically compatible with the larger Ringed Kingfisher and the smaller Green Kingfisher.

The status of the bird varies from its being generally uncommon to being locally abundant. It is to be expected, of course, along rivers and the larger streams, rock-strewn or not, also at estuaries. Though present at larger watercourses, including the mouths of tributary streams, in forested regions, it is absent from streams inside forest if arched over by arboreal vegetation. It perches, as a rule, on rather low branches along the banks. Disturbed, it dips almost to the surface of the water and flies low, usually for a fair distance, before rising to the new perch. Unusually it flies overland from one stream or section of a stream to another. I have rarely seen it hover, only when the wind is blowing. Generally it is met singly, sometimes in separated two's.

It makes scratchy, froglike sounds and a harsh "ek" (or "rek" or "tek"). Another utterance, which is perhaps the one Skutch called a "pleasing performance" (1957, p. 218), is a series of "cheet"'s, suggestive of the river warbler *Phaeothlypis fulvicauda*, followed by staggered "cheet"'s with a kissing quality. When the notes lie between "tseet" and "tsit," this call approaches a rattle.

***Chloroceryle americana* (Gmelin)**

GREEN KINGFISHER

RANGE: Southern Texas to Bolivia and central Argentina.

***Chloroceryle americana isthmica* (Goldman)**

RANGE: Honduras to eastern Panama.

The Green is the common kingfisher of Costa Rica, where it is distributed from the lowlands on both slopes to at least 7000 feet according to Carriker (1910, p. 493) and 8000 feet according to Cherrie [1892 (1891-1892), vol. 2, p. 324]. The birds "are not abundant above about 5,000 feet. They prefer the smaller streams to the larger, although they frequent both. At Boruca I found a pair in a very small creek hidden away in the forest well up in the hills, a most unusual locality for this species" (Carriker, *loc. cit.*). The species is apt to occur at any river, stream, or brook bordered by shrubbery and trees. In forested areas it is absent from streams inside the woods, though present along them in the semi-open where partly or largely open to the sky. In addition to sharing the larger streams and rivers with the Ringed and the Amazon, it almost alone exploits shallow streamlets (outside solid forest). Apparently it never leaves the channels, following their every twist rather than flying across even a neck of ground.

The bird is seen in pairs as well as singly. It dives for small fishes from its perch, usually a low one, not from a hover. Perched, it habitually nods its head and lifts and lowers its tail, synchronously or not. Especially when standing on something flat, it holds its tail a little below the horizontal and flicks it at irregular intervals. In flight, either steady or rising and falling slightly, it reveals the white sides of its tail and utters a pebbly

"tchrit." Its "rattle" sounds more like the twitter of a flycatcher and even resembles the prolonged "chr" of its streamside neighbors, the ovenbird *Synallaxis brachyura* and the little rail *Laterallus albigularis*. I have also transcribed the twitter as a series of rapid "tit"'s or a pebbly roll of tiny "tsick"'s. Other notes, pebbly, scratchy, or creaking, are swallow-like and hummingbird-like.

***Chloroceryle inda* (Linnaeus)**

GREEN-AND-RUFIOUS KINGFISHER

RANGE: Nicaragua to Peru and southern Brazil.

The first and apparently only Costa Rican specimen is that of a male taken June 14, 1927, by Austin Paul Smith at Daytonia Farm in the Sixaola region, reported by Griscom (1933, p. 300). Previously, Richmond (1893, p. 512) had recorded the species near Greytown, Nicaragua. Ridgway [1914 (1901-1950), pt. 6, pp. 435, 436] included Costa Rica in the range. Carriker, who did not include it, apparently could not accept as valid the mere listing of the species by Zeledón (1887, p. 119).

I met the species at only two localities in the northern Caribbean lowlands. Near Puerto Viejo de Sarapiquí I found it, rarely, at a shaded, hard-bottomed stream a little behind the forest border and at a mud-bottomed shallow streamlet well in the interior. It perched no more than a few yards up in the stream-bordering understory, was solitary, seemed rather sedentary, and kept to the stream courses which it followed as a highway. Near Los Chiles, just southeast of Lake Nicaragua, I found it low at the overgrown mouth of a shaded streamlet emptying into the Río Frío. The bird seen by Richmond (*loc. cit.*) "was in a patch of woods, in a damp place near Greytown, some distance from any body of water, and rather an unusual place for a Kingfisher."

In appearance the Green-and-rufous is a large-sized edition of the Pygmy Kingfisher. It is apt to occur together with the Pygmy but not with any other, except sometimes the Green should the two happen to meet at the forest border. The only sound I heard was a repeated "chip-chip-chip," and so on, like that of some small bird.

***Chloroceryle aenea* (Pallas)**

PYGMY KINGFISHER

RANGE: Southern Mexico to Bolivia and southeastern Brazil.

***Chloroceryle aenea stictoptera* (Ridgway)**

RANGE: Southern Mexico to northern Costa Rica.

***Chloroceryle aenea aenea* (Pallas)**

RANGE: Costa Rica to Bolivia and southeastern Brazil.

The Pygmy Kingfisher is known mostly from the Pacific northwest and the length of the Caribbean slope. I found it also at the head of the Golfo Dulce; otherwise I know of no report from all the southwest, throughout which it unquestionably occurs. The species is virtually confined to the lower tropical belt, there being but one report higher, at 2000 feet. The Central American form, *stictoptera*, in Costa Rica at its southern limit, ranges to the Gulf of Nicoya and just short of Puerto Limón, at both of which areas it intergrades with the South American *aenea*, here at its northern limit.

The Pygmy is primarily an inhabitant of woodland, including gallery forest and stands of swampy open woods in dry-forested Guanacaste and tall virgin forest on the Caribbean slope. It occurs, too, in forest-bordering second growth and in mangroves. My observations agree with Carriker's (1910, p. 494) that "the only exception to this [wooded] habitat was a specimen secured on the edge of a small lake in an open pasture at Bonilla, where it was perched on some reeds." Though it can be found along heavily forested banks of rivers and streams, even in riverside scrub, it is more apt to be present at shaded streamlets and little pools inside woodland. There I have seen it obtain minnows from a mud puddle less than an inch deep. In general, it is met uncommonly. Probably it has passed unnoticed in those localities from which it has not yet been reported.

It perches as a rule from a yard to little above eye level in the tangled understory, often sitting tamely despite the observer's close approach. It appears to be solitary but also occurs, perhaps habitually, as one of a

separated pair. It exhibits the usual teetering, rocking, kingfisher mannerism of flicking its tail up as its head is brought down or, following the lead of its head, moving the entire body up and down. This toy kingfisher dives into the water and returns to its perch almost quicker than the eye can follow. Like the Green, it can do so at an angle from the perpendicular and somehow shoot back to its perch along the very same diagonal.

It makes a scratchy "tsweek," a weak "tik," and an unclear "tsirp" or songbird-like "tsip" that may be slightly chirpy, accompanied perhaps by a cocking of its tail. The latter note I have heard from two birds calling back and forth every few seconds. Little "tit"'s or "tsick"'s, coinciding with the continual nods and teeters, sound as though the neck bones of the bird were creaking. Another call, or "song," I have transcribed as a descending wrenlike chatter or a heavy hummingbird-like ripple that finishes haltingly. The bird also makes a pebbly "chitting" as does the Green.

FAMILY MOMOTIDAE

Hylomanes momotula Lichtenstein

TODY MOTMOT

RANGE: Southern Mexico to eastern Nicaragua, extreme northwestern Costa Rica, central and eastern Panama, northwestern Colombia.

Hylomanes momotula obscurus Nelson

RANGE: Locally from northwestern Costa Rica to northwestern Colombia.

In Costa Rica the little Tody Motmot is known only from the Guanacaste Cordillera, mostly its lower Pacific versant, at Rincón de la Vieja Volcano, Cerro Santa María, and Miravalles and Tenorio volcanoes. On the Caribbean slope of the cordillera, the side rarely visited, it is present in unknown abundance but has been taken at Bijagua. So far as known, it is confined to a narrow zone, from the upper tropical into the lower subtropical belts, coincident on the Pacific side with the lower limit of the Caribbean-influenced humid forests that the bird inhabits. Distinctly uncommon in favorable localities, it can be overlooked even when sought assiduously. I could count on finding it only at Rincón de la Vieja and Santa María,

where it seems to be relatively much more common than at Miravalles and Tenorio a little to the south. Apparently this situation has not changed since Carriker noted it in 1910 (p. 498).

The usually solitary bird inhabits the understory in the forested hilly terrain, perching approximately at eye level. It is sluggish in the sense that it sits "stupidly" motionless, except for a side-to-side shifting of its tail as in other motmots and some puffbirds. Its sudden darts for prey are more like those of a puffbird than of the larger, racket-tailed motmots. I have no notes on its voice.

This species is one of several having a peculiar interrupted distribution that skips all or part of southern Central America and resumes in northern South America. Thus, the Tody Motmot comprises two groups, one in southern Mexico and northern Central America, the other in parts of southern Central America and Colombia. Bangs (1909, p. 32) commented on 12 Costa Rican specimens: "Upon comparing these skins with an equal number from Mexico, Guatemala, and British Honduras, I fail to find any constant differences." Wetmore, reporting on birds from southern Mexico (1943, p. 269) and from Costa Rica (1944, p. 51), concluded: "After examination of a small series of these birds the only character that I discern to distinguish a southern form is that, when laid out in geographic order, birds from northwestern Costa Rica and Panamá have the abdomen duller, while in those from Honduras northward into southeastern México this area is definitely whitish." Though the series in the American Museum of Natural History shows, in my opinion, the paleness of the abdomen to be individually variable throughout the range of the species, northern birds do seem to be separable from southern birds by their average lighter under parts and also by their paler caps, with the line of division running through the Nicaraguan "break." Anomalies are the dark-capped birds described by Brodkorb as *chiapensis* (1938, p. 2) and a light-capped specimen (A.M.N.H. No. 478070) from Chitira, Veraguas Province, Panama.

The distribution is nevertheless odd. The Costa Rican population barely enters the far northwest, ostensibly as a southern continua-

tion of the northern *momotula* rather than a northern extension of *obscurus*. The range of the latter is thus interrupted by the very Costa Rica-Chiriquí highlands which, according to Chapman (1923, pp. 51-52), normally share a number of indicator species with his "Subtropical Zone" in northwestern Colombia. This hilly, humid-forested hiatus would appear to be eminently suitable for the Tody Motmot according to my experience with it in Costa Rica and Honduras.

***Electron platyrhynchum* (Leadbeater)**

BROAD-BILLED MOTMOT

RANGE: Honduras to western Ecuador, Bolivia, and Mato Grosso.

***Electron platyrhynchum minor* (Hartert)**

RANGE: Honduras to Panama.

The Broad-billed Motmot is primarily an inhabitant of the Caribbean slope. It is widespread and common throughout the tropical belt and follows the approaches and slopes of the central highlands, probably along well-wooded valleys, to upper subtropical elevations. It spills in small numbers and apparently locally onto the Pacific face of the northwestern divide under humid-forest conditions at lower subtropical elevations northward from the Arenal gap. It has also been recorded from the Caribbean-influenced Dota region, undoubtedly above the tropical belt. Otherwise it is not definitely recorded from the Pacific slope. Carriker's (1910, p. 496) contrary assertion may have been based on a record from Grecia on the northwestern (Pacific) portion of the central plateau, which probably applies to the nearby slopes of Poás Volcano. In appearance this motmot is a smaller edition of the similarly plumaged *Baryphthengus* with which it is largely sympatric.

A bird of the humid life zones, it is common along borders of and breaks in wooded terrain, less common inside forest. It also occurs habitually in second growth with emergent trees, and sometimes it enters the semi-open in the immediate vicinity of woodland. It is seen alone or in two's, occasionally in small groups, usually below medium heights in the trees but also lower or considerably higher. Its resonant squawk, something like "ahnk"

or "awnk" or "k·waww," is diagnostic even when given, as it often is, singly. The bird also makes a series of short "waak"s, an unclear frog-in-throat "waa·waa·waa·waa" of quick short notes, and other similar cries, single-noted or in repetition, including one of loud or soft "kuck"s. Two or three birds calling together make a good deal of noise; their notes are not quite synchronized and differ individually in quality and pitch.

***Electron carinatum* (Du Bus)**

KEEL-BILLED MOTMOT

RANGE: Southern Mexico to Costa Rica.

This Central American species is rare at its southern limit in northern Costa Rica. Its distribution is deceptively like that of the Tody Motmot, which extends from southern Mexico to humid-forested northwestern Costa Rica, where its numbers peter out in the tag end of the range. I know of only four locality records: Bijagua, on the Caribbean slope of the northwestern divide; El Silencio de Tilarán, overlooking Lake Arenal; an unspecified site in the San Carlos region, probably in the foothills; Isla Bonita, on the northeastern approach to Poás Volcano.

From these meager data the Keel-billed Motmot would appear to be an inhabitant of the wetter portions of the hilly subtropical belt, primarily on the Caribbean versant, from the Cordillera Central northwestward. Almost nothing is known about it here in life. Boucard (1878, p. 49), who secured the San Carlos specimen, the first from Costa Rica, said it was "rare" and "goes by pairs in the forest." The bird from El Silencio de Tilarán, a very wet, heavily forested locality, was brought in to me. The man who shot it claimed it was not rare and that it perched on low branches. It occurs at all the above localities together with *platyrhynchum*, which, though relatively uncommon above the tropical belt, is nevertheless more common than the Keel-billed in the latter's own range.

The voice of the Keel-billed was described by Lowery and Dalquest in southern Mexico (1951, p. 595) as "a loud, far-reaching 'cut-cut-cadack,' strikingly like the cackle of a hen," hence obviously different from that of the partially sympatric, congeneric *platyrhynchum*.

***Eumomota superciliosa* (Sandbach)**

TURQUOISE-BROWED MOTMOT

RANGE: Southern Mexico to Costa Rica.

***Eumomota superciliosa australis* Bangs**

RANGE: Southwestern Nicaragua and northwestern Costa Rica.

This beautiful Central American motmot reaches its southern limit in northwestern, Pacific Costa Rica in common with other members of the arid Pacific avifauna. Here it is one of the typical birds of the Tropical Dry Forest, from which it extends a bit southward to Pozo Azul de Pirrís, about halfway along the Pacific coast. Nearly restricted to the lower tropical belt, it has been reported at a higher elevation only at Hacienda Miravalles.

The habitat includes open woods undergrown with shrubs or thickets, gallery forest, wooded stands and small patches of woodland, all dotted with openings, often pierced by trails, and possessing earthen banks. The species has now become a conspicuous feature on the wires and fences along the Inter-American Highway. It flies in dips, sometimes at the height of medium-sized trees. It is seen usually singly or in pairs during the breeding season.

Its characteristic guttural or froglike cry sounds like one of its Costa Rican names, "parabós," or, as I transcribed it, "kwóck-abo." The bird also makes a "ka·wóck ka·wóck" similar to the preceding, a galline "awk awk," and a hoarse "bóer" similar to a cry of the Broad-billed Motmot. Seemingly distant wood-chopping sounds are the "bóer" given weakly in repetition.

***Baryphthengus ruficapillus* (Vieillot)**

RUFIOUS MOTMOT

RANGE: Eastern Nicaragua to western Ecuador, northern Bolivia, and northeastern Argentina.

***Baryphthengus ruficapillus costaricensis* Todd**

RANGE: Eastern Nicaragua and Costa Rica (and probably northwestern Panama).

This striking large motmot has been recorded only on the Caribbean slope, where it is common throughout the tropical belt. It rises locally in diminishing numbers, mostly along valleys, to the lower subtropical belt along the central highlands, also on the approaches to the Talamanca Cordillera, to a

known upper limit of 4000 feet (on the north slope of Poás Volcano). In addition, I found it at the low crest of the northwestern divide beside Lake Arenal.

The Rufous is primarily an arboreal inhabitant of forest, occurring almost always in shadow. It also frequents advanced second growth along the forest border, younger second growth with emergent trees in the immediate vicinity of forest, the nearby heavily shaded semi-open, and wooded banks and valley slopes of rivers and wide streams. Usually it is seen singly or in two's, occasionally in small groups at or a little below medium height but sometimes very high in the trees. In general it is quite shy and reacts to close observation with a perturbed pendulum swinging of its tail, then whirring flies off a little distance. It forages as do other motmots that depart suddenly from a perch, dash toward a leaf, pluck the prey item, and immediately swoop to another perch. Instead of sitting erect, the bird may sometimes stand on a branch, its body tilted obliquely forward and its tail extended back horizontally. It may lower the tail and bring it back up as a sort of display.

The bird makes several cries. One is a resonant hooting "cōot cōot" (or "hōot hōot") similar to that of the Common Motmot but heavier and fuller. Another is a single short "hoo," hollow and dull as an owl's. Another is an owl-like deep "woop," often elaborated through repetition into an arresting rolling series of whoops, mysterious-sounding and ventriloquial. Groups that call in this manner do so with the beak seemingly closed and sound as though high in the trees when actually much lower. I heard a completely different set of cries from birds disturbed by the close presence of a Spectacled Owl. Urgently short-noted, rattlingly guttural, sort of grunted, they could have been those of a large ground bird, perhaps a tiger bittern.

***Momotus momota* (Linnaeus)**

COMMON MOTMOT

RANGE: Mexico to Venezuela, Bolivia, and northwestern Argentina.

***Momotus momota lessonii* Lesson**

RANGE: Southern Mexico to western Panama.

The Common Motmot in Costa Rica is primarily a Pacific species. It is uncommon and local in the southern half of the Tropical Dry Forest, where it is known mostly from the Tempisque Valley and the mainland side of the Gulf of Nicoya, whence it continues sparsely along the Guanacaste Cordillera, from Tenorio to the base of Orosí volcanoes, at upper tropical and lower subtropical elevations. I also found it well up the Cordillera de Tilarán. Southward it is present in unknown frequency in the subtropical Dota region and commonly in the General-Térraba-Golfo Dulce sector, especially in the upper tropical belt, from which its numbers diminish upward through the lower subtropical belt along the slopes and spurs of the Talamanca Cordillera and downward to the coastal lowlands. It sweeps across the central plateau to overlap the Caribbean slope down to the lower limit of the subtropical belt, commonly at the eastern end of the central highlands, uncommonly on the north face of the Cordillera Central.

Hence, the species is uncommon in the headquarters of *Eumomota* in the dry-forested northwest. It is fairly common along the lower Pacific slope of the Guanacaste Cordillera, where it is separated ecologically from *Hylomanes* and *Electron platyrhynchum* and, apparently, geographically from *Electron carinatum* and *Baryphthengus*. I am unable to evaluate a record from "San Carlos" by J. Carmiol, unless it applies to the north slope of the continental divide westward from Poás Volcano rather than to the northern lowlands. In the southwest it is the only motmot proved present. It is also the only motmot over most of the central plateau region, where it occurs abundantly throughout the shaded coffee lands, suburbs and rural areas, even along the sides of automobile roads, and rises through the lower montane belt on the neighboring mountain slopes. Eastward it continues in fair abundance to the end of its range on the Caribbean side.

It frequents open woodland, forest borders, and shaded portions of plantations and agricultural lands in regions from which the original forest has been largely or partly removed or cut over. The extensive areas in which it is common are in regions intermediate between the dry-forested environment

preferred by *Eumomota* and the humid-forested by *Baryphthengus*, *Electron*, and *Hylomanes*. It is most plentiful where competing motmots are lacking, as in the southwest and on the central "meseta," and it is the only motmot found upward from the upper subtropical belt. But even when filling an ecological vacuum, it remains a nonforest bird. Where uncommon or seldom seen, it usually keeps well hidden in jungle vegetation.

The Common is an ultratypical motmot in appearance and general behavior. It sits "stupidly," twitches its racket-tipped tail from side to side like a metronome, unexpectedly about-faces on its perch, occasionally goes to the ground, and suddenly makes darting sallies for prey. It can hover like a trogon to pluck small berries, and I have seen it drawn to the scene of swarming army ants. Its usual cries are a short-noted, low, hollow "hoo-hoó," muffled and throaty, and two or three even-valued "coot"'s. Sometimes, as at dusk, it utters many consecutive "coot"'s in irregular sequence. It also produces a short, muffled, rumbling roll, throaty as in certain pigeons. Very different are a squirrel-like throaty chucking and a galline clucking, both of which sound excited.

FAMILY GALBULIDAE

Galbula ruficauda Cuvier

RUFIOUS-TAILED JACAMAR

RANGE: Southern Mexico to western Ecuador and northeastern Argentina.

Galbula ruficauda melanogenia Sclater

RANGE: Southern Mexico to western Ecuador.

The Rufous-tailed, the common jacamar of Costa Rica, is widely distributed primarily at low elevations the humid length of both slopes. On the Caribbean side it rises locally in greatly reduced numbers to the lower subtropical belt on the northern and eastern approaches to the Cordillera Central. Along the northwestern divide I found it only at the Arenal gap. On the Pacific side, where it occurs southward from the head of the Gulf of Nicoya, it rises locally to, or is only met occasionally in, the lower subtropical belt along the slopes and spurs of the Talamanca Cordillera from the General-Térraba region to

Panama. The species is not known from the northern half of Guanacaste or the central plateau.

It occurs in extensively forested regions as well as in partially wooded areas, as a rule in the immediate vicinity of timbered tracts. Yet it is not, in my experience, an inhabitant of solid forest (but see Skutch, 1963b, p. 354). Its usual habitat is tangled cutover borders of woodland, or dense streamside shrubbery mixed with small and medium-sized trees, or tall thickety second growth, wherever embankments accommodate nesting and cuts, trails, and openings permit unobstructed sorties. The bird perches usually from somewhat above shrub height down to eye level. It is regularly seen alone, commonly in pairs, and sometimes as a trio.

This jacamar makes short, rapid, typically flycatcher-like sallies for flying insects, which it secures with an audible click of the mandibles. Then, returning more often than not to a temporarily favored perch, it may alight with the suddenness of a small dove. Sometimes its sallies are long and involved, and the bird may snap up its prey within a yard of the observer. It takes tiny insects and, more spectacularly, butterflies, dexterously manipulating the latter with its long and slender bill, knocking off all or most of the wings on the return to its perch. The perched bird, keeping its bill uptilted, constantly turns its head alertly and from time to time flicks its narrow tail. Because of its elongated middle rectrices and long slender bill, it brings to mind an Old World bee-eater; because of its iridescent plumage, long and slender bill, and small feet, a giant hummingbird.

Its call note is a sharp arresting "peéup" or "squeúr" given singly or in series. A resonant "peep" is uttered individually. Its variable "song" consists of drawn-out peeps or squeaks followed by a laughing trill that, becoming woodpecker-like, speeds up as does the call of the finch *Arremonops conirostris* (in Costa Rica); a squeak, almost a scream, followed by a short series of notes that, as above, increases in tempo and ends in a woodpecker-like laugh; a low, excited-sounding "bee bee bee," and so on, that runs into a twittering, somewhat throaty trill. The pattern can be reversed, the call slowing instead of accelerating. The tail jerks at each syllable.

Jacamerops aurea (Müller)

GREAT JACAMAR

RANGE: Costa Rica to the Guianas, Bolivia, and Amazonia.

Jacamerops aurea penardi Bangs and Barbour

RANGE: Costa Rica to Colombia.

The Great Jacamar is uncommon to rare at the northern end of its range here in Costa Rica. A Caribbean species virtually confined to the tropical belt, it is not as yet known west of the Sarapiquí sector. There are only four locality records, all below 1000 feet, in the very humid northeast plus another from Carrillo a little higher in the same region. After a gap, which is probably sparsely occupied, the species is again recorded from three places in the very humid southeast. The meager data suggest that the distribution of the species follows the lower slopes of the wet foothills and the neighboring fringe of lowland forest.

I met it usually alone, sometimes in pairs. It is a true inhabitant of virgin forest, occurring from somewhat below medium heights to fairly high in the trees, apparently perching preferentially on slender branches and horizontally strung vines. It strays rarely to the well-shaded semi-open beside the forest border, where I have seen it at shrub height, or lower, in the sort of place in which to expect the other jacamar, *Galbula ruficauda*. Not only is it larger than the similarly plumaged *Galbula*, but it is heavy-bodied and big-chested and has a curved and arched, thick-based, relatively shorter beak. Like *Galbula* it sits "actively," that is, with its beak pointing distinctly above the horizontal, its head looking about alertly on an immobile body, as do trogons, puffbirds, and motmots. Also, it has the habit of suddenly about-facing on its perch. It makes sudden wing-whirring dashes for prey to and from leaves, as does a motmot or puffbird, rather than fly-catching in the air like *Galbula*, nor does it return to the original perch.

A bird of reserved, generally silent demeanor, it nevertheless makes interesting sounds. The most frequent is an essentially one-syllable, protracted, hawklike "kee-éee-eeeü." The listener hoping to gain sight of the invisible author usually waits in vain for the cry to be soon repeated. Once I heard several

times a longer, more involved call when two birds were together. It began with a slow, cat-like "wahaaoww meowww," the second note pitched higher than the first, followed by a long whistle, hawklike as the above-mentioned cry, with a slur or break in the middle that made it sound two-parted and two-leveled. Also given is a prolonged descending whistle similar to the sighing note of the woodhewer *Xiphorhynchus erythropygius*.

FAMILY BUCCONIDAE

Notharchus macrorhynchos (Gmelin)

WHITE-NECKED PUFFBIRD

RANGE: Southern Mexico to Bolivia and Argentina.

Notharchus macrorhynchos hyperrhynchos
(Sclater)

RANGE: Southern Mexico to Bolivia and northeastern Argentina.

This good-sized puffbird is present on both sides of the country from the coastal lowlands to no higher than the upper limits of the tropical belt. Its distribution is strangely curtailed on the Caribbean slope, where it is only known in the northeast, more or less continuously from the Sarapiquí lowlands to the base of the Cordillera Central and to approximately the latitude of Puerto Limón on the coast. It is almost surely present also in the northwestern and southeastern sectors. On the Pacific side it occurs from north of Liberia southward to Panama; it is apparently rare in the northern Guanacaste lowlands. I also found it on the Pacific face of the northwestern divide, only at Miravalles. Though widespread, it is met occasionally and irregularly at best.

The species can be found in extensively forested and partially deforested regions in both the relatively arid and very humid life zones. It is generally absent from solid woodland, yet occurs in the immediate vicinity along the forest border and in the neighboring tree-scattered semi-open. It often perches high, as on an exposed horizontal limb near the top of a tall tree, infrequently on the branches of medium-sized trees down to 15 feet from the ground. As a rule it sits sluggishly for long periods, when it resembles a stout-bodied, black-and-white kingfisher with a hooked beak. Actually it is looking about

alertly. It must be exceptionally keen-eyed, because it suddenly makes long direct dashes to pluck living prey from foliage. Its normal flight is hurtling, when the bird appears surprisingly slender-bodied. Although encountered singly as a rule, it occurs in pairs when preparing a nesting hole. Thus, I saw both sexes take turns at excavating a cavity in a termite nest some 40 feet from the ground. (Skutch's account [1948b, pp. 82-83] of the nesting of the congeneric *pectoralis* in Panama describes in detail virtually the same experience.)

As this puffbird usually guards its silence scrupulously, it took me a long time to get to know its voice. Its only cry, to my knowledge, is a minor-keyed "püür" that weakens and drops despairingly: a somewhat nasal clear note which is sort of screamed, with the main (first) portion a little longer than the second, and lasting perhaps one second. The beak of a calling bird appears to be shut and its throat not to move.

Notharchus tectus (Boddaert)

PIED PUFFBIRD

RANGE: Costa Rica to Bolivia and Brazil.

Notharchus tectus subtectus (Sclater)

RANGE: Costa Rica to western Ecuador.

The little Pied Puffbird was added to the Costa Rican avifauna by Austin Paul Smith, who collected a male January 22, 1926, at Santa Rosa Farm (altitude 25 feet) near Puerto Limón. It was apparently not reported again until September, 1956, when Leslie R. Holdridge observed a bird at close range near Puerto Viejo in the Sarapiquí lowlands. Later at the same site I met the species occasionally through the year 1957-1958, and again in September, 1961. The bird is evidently very uncommon in Costa Rica, where it is confined, so far as known, to the tropical belt, probably below 1000 feet. Reported only from the northeastern and east-central lowlands, it is probably distributed sparsely but continuously to Panama.

This is a nonforest species that frequents tree-scattered clearings, such as plantations and pastures, in generally wooded country. I saw it invariably as a loose group of several separated individuals trooping high in the semi-open from tree to semi-isolated tree and

to small stands of trees along the forest border. The birds were quite active and very noisy; otherwise I might not have noticed them. I could not be certain whether they were actually foraging while traveling about the countryside. The one seen by Holdridge, however, was a solitary individual sitting quietly at shrub height in the partially shaded semi-open beside intermediate secondary growth mixed with trees.

Its call is an arresting, flycatcher-like "pseeee tidit·tidit·tidit" intermixed with a few protracted "pseeee" 's and kingbird-like twitters. The bird also makes equally excited-sounding nasal twitters.

***Malacoptila panamensis* Lafresnaye**

WHITE-WHISKERED PUFFBIRD

RANGE: Southern Mexico to western Ecuador.

***Malacoptila panamensis inornata* (Du Bus)**

RANGE: Southern Mexico to northwestern Panama.

***Malacoptila panamensis panamensis* Lafresnaye**

RANGE: Western Costa Rica to northwestern Colombia.

The northern Central American *inornata*, which ranges through eastern Costa Rica to northwestern Panama, is distributed throughout the tropical belt. It rises locally to the subtropical belt at low places in the northwestern divide north from Lake Arenal, on the northern slope of the Cordillera Central, and, especially, along the Reventazón Valley to the eastern and southeastern slopes of the central highlands. The southern Central American *panamensis* is confined to the Pacific slope where, from its center in the humid southwest, it spreads northward in greatly diminished numbers in the Tropical Dry Forest to the head of the Gulf of Nicoya and along the lower slopes of the Guanacaste Cordillera (Tenorio and Miravalles). Rising regularly into the subtropical belt in the Dota and Térraba regions, it has been recorded, respectively, at 3800 feet (San Joaquín de Dota) and 4700 feet (Skutch, 1948b, p. 90). The two forms appear to meet at the northwestern divide and the southern edge of the

central plateau. The species is absent from the plateau proper.

Birds from the Caribbean slope show more individual variation than those from the Pacific, and occasional specimens of one race resemble those of the other. Either sex of *panamensis* can usually be distinguished from the corresponding sex of *inornata* in accordance with Ridgway's key [1914 (1901-1950), pt. 6, p. 388]: under parts strongly two-toned and more heavily streaked in *panamensis*. Also, some individuals of *panamensis* tend to streakiness rather than spotting of the pileum, which is concolorous with the back instead of tending to grayish as in some *inornata*.

The White-whiskered is the most commonly seen puffbird in Costa Rica. A forest-based species, it is present but distinctly uncommon inside virgin forest, far more abundant along the overgrown forest border, in thickety tangled shaded second growth mixed with emergent trees, and at the wooded edges of tree-scattered openings generally. It enters adjacent well-shaded portions of the semi-open toward dusk, as noted by Skutch (*loc. cit.*), and also during overcast afternoons. As a rule it perches low, from approximately shrub height to eye level in the forest understory or on low branches of trees in the semi-open. It occurs singly, in pairs, and in family-sized groups.

Not a shy bird, it might be called "stupid" as it sits scanning the surrounding vegetation quietly and serenely. Perching erectly it resembles a large-headed, long-billed, red-eyed, white-mustached, stoutly compact, smallish bird apparently without a neck. Its short narrow tail is lifted slowly from time to time, or flicked upward or jerked sideways, or twisted from side to side as is that of a motmot. The bird flies little and not far. Its direct sallies are aimed at securing animal prey, usually from a leaf. It often takes large invertebrates, including certain armor-plated terrestrial centipedes several inches long.

Its several sounds, all weak and thin, are usually accompanied by a movement of the tail. Probably the most common note is a gentle "tsinnnn" (or "ssnnnn"), very thin and high-pitched. Also given are a gentle, prolonged, slightly descending "ssssssss"; a minor-keyed, somewhat descending, thin

"tsee" or "tsüü"; a strong hummingbird-like descending and weakening "tsirrrr" (or "tseerrr"), uttered many times with the bill wide open. The "tsee" or "tsüü" may be given several times at a successively lower pitch so that the resultant "call" brings to mind a song of the wren *Microcerculus marginatus*. In addition, I have heard from fledged young, seated on a branch and being fed by a parent, a weak scratchy note and a weak sibilant chittering.

***Micromonacha lanceolata* (Deville)**

LANCEOLATED MONKLET

RANGE: Costa Rica to Peru and western Brazil.

This diminutive puffbird, at its northernmost limit in Costa Rica, is known from two specimens taken by Austin Paul Smith. One, a female with enlarged ovaries (A.M.N.H. No. 389988), the type of *austinsmithi* Dwight and Griscom, was collected May 1, 1924, at an elevation of 1000 feet near Carrillo on the northern slope of the Cordillera Central. The other (L.A.C.M. No. 16249), a male, was taken March 10, 1929, at La Hondura, some 2000 feet almost directly above Carrillo. Evidently a rare bird in Costa Rica, known only from the very humid lower northern (= Caribbean) slope of the central highlands, it could, if an inhabitant of forest, be easily overlooked. I did not meet it.

Birds from Costa Rica and western Panama, described as *austinsmithi*, are so doubtfully distinct from the nominate form that only by examination of a yet-to-be-collected series of specimens might their racial characters perhaps be substantiated.

***Monasa morphoeus* (Hahn and Küster)**

WHITE-FRONTED NUNBIRD

RANGE: Extreme southeastern Honduras to Bolivia and southeastern Brazil.

Monasa morphoeus grandior
Sclater and Salvin

RANGE: Extreme southeastern Honduras to northwestern Panama.

The White-fronted Nunbird is a widespread Caribbean species virtually restricted to the tropical belt, mostly below 1000 feet. A forest-based bird not uncommon inside

virgin forest, it is seen most often along woodland borders both in extensively forested and partially deforested regions. As a matter of course it enters adjacent shaded plantations and uninhabited tree-scattered clearings and sometimes contiguous patches of second growth. In the forest it usually occurs from well up in the trees down to 15 feet in the understory; at the forest border and in the semi-open, from high in the trees regularly to below medium heights, even down to eye level.

Where especially abundant many individuals are scattered about and may congregate in groups of a dozen birds or so. Where less abundant it is seen in two's or three's much higher in the trees. Unmolested, as in "wild" areas, it is usually quite fearless of the observer. The bird subsists entirely on animal food. It plucks insects by fluttering at or sailing against foliage and takes prey to the size of a large katydid by means of fly-catching sallies. I have seen it hold in its coral bill small frogs, small lizards, large plated centipedes, and scorpions, which it then swallowed unconcernedly. Regularly dropping to the ground in the semi-open, it stands short-legged, often in a quandary, so to speak, probably because the sought item has crawled into concealment; the bird may then flick aside some leaves. It also focuses attention on the flushing drives of army ants.

This puffbird sails and circles gracefully and unhurriedly rather than darting like an arrow; returning from a sally it glides upward to a perch. In the air its wings appear rather short and rounded, and its tail, unlike that of other Costa Rican genera, is long and rounded, broad-feathered and full. The seated bird, always appearing good-humored and serene, is apt suddenly to switch around on its perch, like a motmot. Its tail, hanging perpendicularly at an obtuse angle with the slightly inclined body, is often raised and lowered as in trogons and vibrated in accompaniment to most of its calls. Apparently this species does not jerk its tail or move it from side to side as do other Costa Rican puffbirds. Several associated individuals in the semi-open may engage playfully in short sallying flights the object of which is obviously not to catch prey.

A very vocal, often clamorous bird, it

makes several kinds of cries. The most characteristic consists of a few querulous low whistles that may, or may not, precede an excited gabble, the rapid portions of which sound like a police whistle. Some phrases, which I transcribed as "pee·peepeepee·peeple," bear a resemblance to the call of a neighbor, *Cacicus uropygialis*, and seem agitated or angry when several birds call together (see below). This is the only call during which I have not seen the tail vibrate. Also given are rather smooth notes, such as produced by a small pulley, at times rippled musically in a soft mellow manner; a weak "ank-ank" or "woof-woof"; a little "how how," or "hoo hoo," or "oo·oo" as well as a single "oo"; a trogon-like "chahring" "púchuchur"; a low nasal quick "chíkara"; a full-voiced "kü-kü-kü-kü-kü" of equal-valued notes possessing an "aow" quality similar to that of the antbirds *Formicarius analis* and *Myrmeciza exsul*; musical, nasal, whining notes of variable speed, excited-sounding in part, resembling those of the woodhewer *Xiphorhynchus guttatus* when stationary on a trunk.

It took me a while to realize that the "chickling" rattling gabble has social significance. Having noted several birds converging separately from different directions at a tree partially hidden from my line of sight, I approached closer. Four birds evenly spaced 6 inches apart were seated along a horizontal limb about 20 feet up. With their necks stretched and bills pointing upward, their spread tails lifting and lowering, they began to call with wide-open mouths for all they were worth, excitedly and in unison, for periods lasting half a minute to over a minute. Some 8 feet higher on the same tree was seated another set of three motionless individuals, also spaced 6 inches apart, listening in "rapt" attention until the birds below had finished, then they began to call. Now the birds below were listening entranced. Still evenly spaced apart, they were sitting with the two on the left facing left, the two on the right facing right. Meanwhile a lone bird not taking part in the exercise was perched a yard or so away from the lower group. Like a transfixed spectator it did not remove its gaze from the participants for the duration of the performance.

On another occasion I observed a chorus of

six birds seated along a branch, all facing in the same direction, frontward, except for one reversed individual (the second from one end) that faced the opposite way. These birds were divided into two sets of three individuals, the sets separated by a greater distance than that between the members of either trio. The middle member of one trio, which at first was not quite evenly spaced from its fellow on each side, soon sidled to an exact midway position. The six birds called in unison, but this time there was no second group with which to alternate their efforts.

The concerts usually lasted a total of five to 10 minutes. At the conclusion the birds waited a little while before relaxing their stiff attitudes, then started to preen. After sitting an additional 10 minutes or so, the quiet birds departed one by one at staggered intervals.

FAMILY CAPITONIDAE

Eubucco bourcierii (Lafresnaye)

RED-HEADED BARBET

RANGE: Costa Rica to western Venezuela and Peru.

Eubucco bourcierii salvini (Shelley)

RANGE: Costa Rica and western Panama.

The species is at the northern limit of its range in central Costa Rica. Here it is primarily an inhabitant of the wet subtropical belt with its center of abundance between 2500 and 4000 feet above sea level. Most records stem from the Caribbean versant of the central highlands, where the bird descends occasionally to the upper limit of the tropical belt, as at the northern foot of the Cordillera Central, and regularly rises to at least 6000 feet in the lower montane belt. Having found it on the northeastern slope of the Talamanca Cordillera, I feel sure it is distributed continuously southward along the Caribbean side to Panama. On the Pacific side it appears to be not uncommon in the Dota region and locally common, uncommon, or nearly lacking along the Talamanca Cordillera. Occasionally it descends to the upper tropical belt in the Térraba-Coto Brus drainage. It is unknown from the northwestern divide, from which it is probably absent.

In the very humid portions of its range the

Red-headed Barbet may be expected regularly on ridges, along cuts and trails, in forests and forest-bordering second growth, almost always in regions that are at least fairly heavily forested. Strictly arboreal, it may forage high in the trees, but usually it is seen at or below medium heights. It is found, for the most part, singly as a member of a traveling mixed band of arboreal small birds. Occasionally two individuals, of the same or opposite sexes, may be attached to the band, but they pursue their activities independently of each other. Under especially favorable circumstances several individuals can be viewed at once, and sometimes a few birds form an unaccompanied group of their own. I have seldom seen a male and female side by side.

The animated foraging of this barbet combines the continuous activity of a small tanager and the rummaging so characteristic of an arboreal ovenbird. If a male, his red head remains for a moment dissociated from the body, as if it were a red flower set among agitated leaves or swaying on a vine; if a female, the streaking of the under parts will probably draw attention first. Clinging, hanging, stretching, or hopping, climbing, fluttering, the bird seems too intent on its search to be disturbed by close observation. Though constantly disappearing in the luxuriant viny foliage or dashing off in a bee-line to another tree, it may pause absorbed, so to speak, before an engaging object. Exhibiting great interest in stiffened, brown, curled, and dangling leaves, it investigates these myopically, passing its bill over them and inserting it like a sensitive probe. The bird is also drawn to scale-barked twigs along which it maneuvers its half-opened bill to squeeze them along their length in a palpably testing manner.

I did not knowingly hear this bird make a sound, other than the rather loud one produced regularly by its fluttering wings, during the course of dozens of observations spread over several years. That it should really be voiceless seems inconceivable. Unquestionably it possesses a note which I could not assign to it over any of the small birds by which it is usually surrounded. The watcher of a nesting pair will no doubt be rewarded with the discovery.

Semnornis frantzii (Sclater)

PRONG-BILLED BARBET

RANGE: Costa Rica and western Panama.

In Costa Rica the Prong-billed Barbet seems to be primarily a Caribbean species known almost exclusively from the central highlands and most abundantly on their Caribbean versant. It also inhabits the mountains along the southern edge of the central plateau and in the Dota region. I found it additionally on the Pacific slope of the Cordillera de Tilarán, this being the only report for the northwestern divide. Strangely, I can find no previous record for the Talamanca Cordillera along which, as with the preceding species, I found this barbet on the northeastern slope, hence do not doubt it continues onward to Panama. Vertically it ranges between a low of about 1500 feet in precipitous cool pockets on the north side of the Cordillera Central and a high of 8000 feet or so at the lower limit of the montane belt. It is most plentiful in the upper middle altitudes and not uncommon under suitable local conditions at or below the middle of the subtropical belt. An inhabitant of chilly cloud-forested mountains, it frequents heavy forest, patches of woodland, edges, and tree-scattered pastures. It generally occurs at and well below medium heights in trees and shrubs. Sometimes it drops briefly to the ground.

Except during the breeding season, it is seen in small flocks the members of which forage as a group but straggle singly, as do toucans, when changing sites. They cross small openings in straight trajectory by means of an uninterrupted flutter to alight heavily at the new stopping place. The cylindrically stout-bodied birds hop along branches as to the manner born but exhibit no acrobatic ability. With the body horizontal or downwardly inclined they may jerk about excitedly, again in the manner of a toucan, and, stretching and flicking nervously, the birds may thus spasmodically complete a circle. Normally, however, these deliberately behaved birds sit about rather quietly and are not shy, as they can sometimes be approached within a couple of yards. Feeding on small fruits, the bird may hold a berry in its beak and, as does a tanager,

squeeze it gently till the juice runs down its visibly pulsing throat, then drop the emptied skin. Paired individuals preparing to breed are apt to reveal their presence when noisily cutting a nesting hole. Clinging to the mossy bark as does a woodpecker, the bird turns its grosbeak-like head to one side to empty its pronged bill. The two sexes alternate in the pecking and excavating.

The Prong-billed's far-carrying "caw-caw-caw-caw-caw," and so on, is one of the distinctive sounds of the central highlands. Usually given on an even plane, it sometimes rises steplike in pitch. The call of a single bird might be taken for that of a trogon or perhaps that of an Emerald Toucanet (*Aulacorhynchus prasinus*). Given in duet or as a galline chorus, it possesses a special character, like an Indian yell in which the palm of the hand is rapidly and repeatedly pressed against and removed from the mouth. Also uttered are raspy barking chucks, a very dry, sharp-edged chatter, and a throaty metallic "skurr" by birds chasing one another from branch to branch.

FAMILY RAMPHASTIDAE

Aulacorhynchus prasinus (Gould)

EMERALD TOUCANET

RANGE: Southern Mexico to Peru and western Venezuela.

Aulacorhynchus prasinus maxillaris Griscom

RANGE: Costa Rica and western Panama.

The Emerald Toucanet is distributed along both slopes of the cordilleras of Costa Rica from the lower border of the subtropical belt to timber line. It is very common throughout the central highlands, especially the Caribbean versant, and extends abundantly northward along the Cordillera de Tilarán, relatively uncommonly on the Guanacaste Cordillera. Southward it occurs in undetermined frequency, probably commonly, along the Talamanca Cordillera. Its center of abundance follows the upper half of the subtropical and most of the lower montane belts. Rare, locally uncommon, or probably seasonal below 3000 feet, the bird has been recorded during the postbreeding season from a low of 1500 feet on the eastern slope of Turrialba Volcano, during the breeding season

from 2500 feet at cloud-forested La Hondura on the northwestern slope of Irazú Volcano. It is common perhaps only seasonally at montane-belt elevations.

The only member of its family found above the subtropical belt, it is primarily an inhabitant of the cool, misty and rainy mountains, both in extensively forested and partially deforested areas, especially where there are tree-scattered pastures and plantings bordered by woods. In view of its preference for breaks and edges, including cutover roadsides, I doubt whether it does well in solid forest. Usually it keeps from medium heights down to shrubs and leafy scrub, from which it rises to the canopy or drops to the ground occasionally. Ferry (1910, p. 266) found it roosting in the tops of very tall trees. Generally it occurs in small bands that apparently wander about with fluttering beats and dipping sails from one stopping place to another. The birds leave a site individually in staggered follow-the-leader style as do araçaris, anis, and chachalacas. They feed on the fruits produced so profusely by jungly growth at edges, they prey on large invertebrates, and I have even seen them fly-catch successfully. The bird also has a notorious reputation as a robber of nestlings.

Though appearing sluggish at times, this toucanet is noisy, active, and excitable. It has the alert-demeanored habit of frequently leaning forward, then pulling back. It nods energetically between sweeping lateral jerks of its head and beak while holding its tail perpendicularly cocked and keeping up a low croaking which it may speed and lower in pitch excitedly. Or, stretching its neck out in front and its tail behind, then slowly depressing both, it maintains the strained pose before jerking them both upward. In either "display" the contrasting brown of the crissum is exposed as the tail is cocked or jerked. Perched quietly, as seen from below, the bird is camouflaged green and its outline broken by the brown of the crissum. Roosting captive birds, and undoubtedly hole-dwelling wild ones too, bury their beaks in their backs which they then cover by arching the tail completely over to make of themselves an unrecognizable ball.

The vocalizations consist largely of barks

and croaks. A continuous nasal low barking, patterned not unlike the call of *Ramphastos sulfuratus*, conveys a sense of excitement when given in accelerating tempo. The barks may also be given singly and intermixed with a deeper "ahr" or a quick churring. Also given are low croaks that develop into a hacking set, short series of croaking bass notes, a throaty bass churring, and an excited rattle seemingly in the gullet. Other cries have the same general character as the above.

***Pteroglossus torquatus* (Gmelin)**

COLLARED ARAÇARI

RANGE: Southern Mexico to Colombia and Venezuela.

***Pteroglossus torquatus torquatus* (Gmelin)**

RANGE: Southern Mexico to central Panama.

The Collared Araçari is widely distributed exclusive of the southwest, where it is replaced by the congeneric *frantzii*. On the Caribbean side it occurs throughout the tropical belt and to about 3000 feet in the lower subtropical belt, above which altitude it hardly rises, along the central highlands (and almost certainly along the Talamanca Cordillera). Lapping over low portions of the continental divide northward from the region of Lake Arenal, it spreads in small numbers into edaphically moist woodland in dry-forested Guanacaste, where it is the only toucan present, from about the center of the province (Liberia) through the Tempisque basin. It is absent from the largely denuded plateau region.

Though it occurs rather commonly in virgin forest, usually at canopy height, it is much more plentiful along the forest borders and in the semi-open dotted with many shade trees and in second growth with emergent trees. I even met it at eye level in lowland coffee bushes. As a rule it troops about in bands of several to a dozen or more active individuals. Especially when crossing an opening the birds straggle after one another at intervals as though embarking on a venture fraught with danger, flying with rapid steady beats or fluttering on an even keel in a straight line either horizontal or somewhat tilted upward. This araçari often feeds on cecropia pods, palm nuts, and vine-hung

fruits in situations where its long beak can be employed to advantage. A lively noisy bird, it often features an animated stiff jerking, nodding, teetering, stretching, or bending accompanied by its cry. In the forest, incidentally, I have seen it bathing in the hollow of a limb some 50 feet up.

Its usual cry is a high-pitched, two-syllable hiccup that sounds like the word "feliz" (accent on second syllable), one of the common names of the bird, and resembles the metallic note of the ani *Crotophaga sulcirostris*. Also given are a parrot-like or woodpecker-like "arrr ditdit" and an odd guttural twitter.

***Pteroglossus frantzii* Cabanis**

FRANTZIUS' ARAÇARI

RANGE: Pacific slope of southern Costa Rica and western Panama.

Frantzius' Araçari is confined to the rather distinct faunal zone that covers the Pacific slope of southern Costa Rica and contiguous western Panama. It is largely if not entirely allopatric with and virtually surrounded by the widely distributed *torquatus*. In life its red upper mandible immediately distinguishes it from *torquatus*, as do also its broad red breast band and very large chest spot. The beaks of museum specimens lose their bright colors, but *torquatus* has prominent tomial serrations, *frantzii* weak ones. This specific morphological difference is apparent in the illustrations by Eckelberry (*in* Skutch, 1958b).

The species occurs from approximately the line of the Pacific Railroad on the mainland side of the Gulf of Nicoya southward to Panama. It is most abundant in the tropical belt and rises in fair numbers, perhaps only locally, to lower subtropical elevations in the Aguacate, Candelaria, and probably the Dota Mountains, and to approximately 4500 feet the length of the Talamanca Cordillera. I agree with Carriker (1910, p. 575) that an old record from San José and two from Angostura and San Carlos, on the Caribbean slope, are almost surely in error. Perhaps it meets *torquatus* at the Gulf of Nicoya and, especially, the Aguacate Mountains, the latter largely under the Caribbean climatic influence, but as yet there is no evidence of intergradation.

The habits of the two species seem to be

very much alike, and I cannot distinguish between their typical call notes. The present species, however, makes two kinds of sounds I do not recall hearing from *torquatus*: a vibratory bass croak similar to that of *Ramphastos* and a weak reedy rattle.

***Selenidera spectabilis* Cassin**

CASSIN'S ARAÇARI

RANGE: Honduras to western Colombia.

Cassin's Araçari is primarily a species of the humid Caribbean slope. Most records stem from the east-central and northeastern sectors, from the first ridges and foothills in the lower tropical belt inland to perhaps the middle of the subtropical belt on the approaches to the Cordillera Central. It has been recorded at least twice from the northwestern (Pacific) extremity of the plateau region (Aguacate Mountains; Naranjo), an area more or less continuous with the slopes of Poás Volcano and under Caribbean climatic influence. In addition, it was found under similar climatic conditions by Underwood at Tenorio and by me at Rincón de la Vieja Volcano on the forested Pacific versant of the Guanacaste Cordillera. Though still unknown from the southern part of the country, it is almost surely present along the largely unworked eastern side of the Talamanca Cordillera, perhaps also in the Dota region.

The species evidently performs a biannual vertical migration. It is present locally in fair numbers during the nonbreeding season (September–October to March–April) in the lower portions of its range, down to 300 feet above sea level. During the rest of the year, when it breeds and rears its young, it occurs along cool wet-forested ridges and slopes higher in the subtropical belt. At the higher elevations it is usually seen alone or in pairs, sometimes in groups of three or four; in "winter" at the lower elevations, usually in groups of four to six individuals, sometimes alone.

The only uncommon Costa Rican toucan, it is the one most restricted to forest. It is met most often at breaks in forest, along the forest border, or in thinned woodland, less often in the tree-scattered semi-open beside forest, occasionally in second growth close to forest. It occurs at all heights in the trees, usually not very low. In size, proportions,

actions, gregariousness, and habit of moving about (in "winter"), it is a counterpart of the sympatric *Pteroglossus torquatus*, than which it is everywhere far less abundant but a truer denizen of forest. It differs strikingly from *Pteroglossus*, however, in style of plumage, and the color pattern of its beak resembles that of the large *Ramphastos swainsonii*.

Its voice is completely different from that of *Pteroglossus* but amazingly like that of *Ramphastos sulfuratus*. Thus, calling alone or in chorus, it makes the same sort of creaking "krek-krek" while jerking its head and double-jerking its tail rhythmically. To my ear it differs from that of *R. sulfuratus* only in being double- instead of single-syllabled.

***Ramphastos sulfuratus* Lesson**

KEEL-BILLED TOUCAN

RANGE: Southern Mexico to Colombia and western Venezuela.

***Ramphastos sulfuratus brevicarinatus* Gould**

RANGE: Southeastern Guatemala to northern Colombia and adjacent western Venezuela.

The Keel-billed Toucan in Costa Rica is essentially a Caribbean species found throughout the tropical belt and regularly within the lower limits of the subtropical belt. Here and there it rises higher in the subtropical belt, as along the northern slope of the Cordillera Central, in the Reventazón watershed, and along the northwestern divide, the Pacific slope of which the bird overlaps locally to its base in the Tropical Dry Forest (as at El Pelón de la Altura). Its distribution bypasses the central plateau proper on two sides, one prong reaching the Aguacate Mountains by way of the Cordillera Central, the other the Dota region by way of the mountainous southern border of the plateau.

The species occurs exclusively in wooded areas, both in extensively virgin-forested and in partially deforested regions. It is not uncommon inside solid forest where it frequents the canopy whether high or dipping lower, as at a forested swamp. It is seen more often along the borders and in the adjacent semi-open where tall trees are usually mixed with smaller ones, generally from medium heights to high in tall trees. It occurs as a rule in small groups that seem to wander over a

home range, seldom alone. In forest a heavy wing rustling overhead followed by falling debris often reveals the presence of either this or the following species (*R. swainsonii*). Its block-patterned coloration destroys the outline of the resting bird in the light-flecked upper branches, where it may warily look about with deliberate slowness. Ordinarily the bird is rather noisy and quite animated. It cannot help but draw attention to itself when crossing an opening with labored flaps and glides, its long beak seemingly overbalancing its head as if it were carrying a banana.

Its froglike cry, a repeated, essentially one-syllable, dry "cr-ér" or "currék" (the Costa Rican name of the bird is "curré"), sounds like the creaking of boots or a stepping on nutshells. It begins with a heavy creak or tunes up, so to speak, with a number of introductory bass "krekk" 's or several piglike grunts as deep as those of the cormorant *Phalacrocorax olivaceus*. The bass croak is also given singly. The calling bird may toss its head at each note, successively a little lower in a stepwise manner, and also turn it from side to side until the end of the series. Usually two or more birds call together, in time with one another or not. Because individual rhythms differ, a strange effect is produced as the cries syncopate, alternate, and coincide cyclically.

***Ramphastos swainsonii* Gould**

SWAINSON'S TOUCAN

RANGE: Honduras to western Ecuador and Venezuela.

Swainson's Toucan is distributed over the humid life zones along the Caribbean slope and in the southwest; it seems to have gone unrecorded in the Dota region. From the northern Caribbean lowlands it laps onto the Pacific slope of the Guanacaste Cordillera in very small numbers; there is no report from the Cordillera de Tilarán. Elsewhere it rises locally well into the subtropical belt, especially at the eastern end of the Cordillera Central and the Reventazón watershed, also on the slopes and spurs of the Talamanca Cordillera in the southwest. It is absent from the Tropical Dry Forest and the entire region of the central plateau.

The two large *Ramphastos* toucans are

common to abundant in most parts of their ranges, where either species of *Pteroglossus* is also common to abundant. They occur together everywhere on the Caribbean side. But in the southwest, where Swainson's is common, *sulfuratus* is completely absent. Swainson's, as indicated above, is scarce along the northwestern divide, where *sulfuratus* is very common. Compared with *sulfuratus*, Swainson's tends to inhabit more heavily forested regions, but does not rise commonly well into the subtropical belt. However, I have been unable to distinguish between the two species in latitude of behavior and variety of habitat. Both are often equally abundant at the same sites and may even occur together in the same tree. The fact that Swainson's is considerably heavier-bodied and longer-billed might be significant. The differential weight relationship is paralleled in other paired, more or less equally common, ecologically similar, sympatric species, such as the parrots *Amazona farinosa* and *A. autumnalis*, the woodpeckers *Phloeocoastes* and *Dryocopus*, and the cotingas *Lipaugus* and *Rhytipterna*.

Like *sulfuratus*, Swainson's flies across openings, alternating flaps and glides, losing height gradually as if overburdened by the gigantic beak, yet sailing easily up to a branch at the new site. Perched, it is apt to lean forward until the end of its beak points almost vertically into space and to look around deliberately. Or, sitting erect, it may look about slowly, its beak necessarily passing more rapidly through a wider arc than its head, then jerks its head to another position and repeats the supercilious inspection.

It makes a loud and deep piglike grunt, as does *sulfuratus*. Heard unexpectedly close, this cry can be very disconcerting to the listener. The typical call, completely different from that of *sulfuratus*, is the "Dios te de" mentioned by Van Tyne (1929, pp. 8, 18). Regularly lengthened to "Dios te de, te de, te de," it has a nasally resonant, guan-like or *Herpetotheres*-like quality. The calling bird usually tosses up its head and beak or, combining this with a side-to-side movement, jerks up its head between the lateral sweeps and moves its tail rapidly up and down. It also makes a very rapid piglike rattle that might bring to mind the flipping of pages of a heavy book. Another cry is a bark much like

that of an agouti, preceded at times by a fluttering noise such as the wing rustling of a Black Vulture.

FAMILY PICIDAE

Picumnus olivaceus Lafresnaye

OLIVACEOUS PICULET

RANGE: Guatemala to western Ecuador and Venezuela.

Picumnus olivaceus flavotinctus Ridgway

RANGE: Southwestern Costa Rica to central Panama.

The Olivaceous Piculet is restricted to the southern half of the Pacific side of the country. There it occurs primarily in the Tropical Moist Forest Life Zone; it has not yet been recorded from the wet-forested Golfo Dulce region. It ranges upward in fair numbers to at least 3000 feet and can still be met locally to 4000–4500 feet in the Dota region and on the Talamanca Cordillera, along which, unlike the situation in the lowlands, it is found to the Panamanian border. But only in the drainage of the Río Térraba and its tributaries is it met commonly and regularly.

The species is almost if not entirely absent from tall forest. It is found, rather, in thinned woodland with undergrowth, in bushy, shrubby, and thickety openings, at overgrown borders, and in jungly growth. As a rule it frequents the understory in which it prefers viny twiggy tangles, apparently avoiding trunks and heavy limbs. Only occasionally is it to be seen to 30 feet from the ground in opened woodland. Usually it occurs in pairs, sometimes in three's or four's. The energetic little birds peck the twiglets sharply, working away busily. They cling without the help of the soft tail, which is often angled obtusely downward as in arboreal furnariids. The piculet often perches "normally," in the manner of a songbird, or it may stand on a twig with one foot ahead of the other. Bearing a vocal resemblance to the rather similarly behaved, sympatric *Xenops minutus*, it utters a laughing rattle, a very weak *Tiaris*-like trill, and a sharp little "pss pss."

[The northern Central American race, *P. o. dimotus* Bangs, which is apparently confined to the Caribbean slope, was taken near San Carlos in southern Nicaragua, only a few

miles from the Costa Rican border, by Richmond (1893) and by Miller, Griscom, and Richardson (A.M.N.H. No. 144001). Though I did not happen to meet it in the adjacent Río Frío region, this race will almost certainly be found eventually in Costa Rican territory.]

Piculus rubiginosus (Swainson)

GOLDEN-OLIVE WOODPECKER

RANGE: Southern Mexico to the Guianas, Bolivia, and northwestern Argentina.

Piculus rubiginosus uropygialis (Cabanis)

RANGE: Costa Rica and western Panama.

The Golden-olive Woodpecker inhabits the middle altitudes on both slopes along the mountains running the length of the country. It is without question most abundant on the humid Caribbean versant of the central highlands, looping from the southwestern approach of Poás Volcano eastward along the northern slope of the Cordillera Central to the Reventazón Valley and nearby ridges, then westward in the mountains forming the southern border of the central plateau. From the central highlands it continues southward through the Dota region and along the slopes and spurs of the Talamanca Cordillera to Panama, also northwestward along the Cordillera de Tilarán, where I found it common at two localities, and the Guanacaste Cordillera, where recorded only from Cerro Santa María.

The species becomes common upward from 2500–3000 feet, and its center of abundance follows the upper two-thirds of the subtropical belt. Apparently it does not descend below the lower limits of the belt, but rises in diminishing numbers well into the lower montane belt. Although forest-based, it is met most often along breaks in wooded hilly terrain, at forest borders, in thinned forest, and at shaded openings. Usually it is seen singly or in two's fairly high in heavily foliaged trees. Instead of habitually climbing trunks it tends to move about like a woodhewer or ovenbird among mossy limbs, airplants, hangings of one sort or another, leafy twigs, and woody vines, but it pecks and tattoos instead of probing and rummaging.

Its recognizable cry is a loud and resonant "keek," "keep," "keer," or "kack," sometimes repeated. Rather jaylike (i.e., *Cyano-*

citta), it also suggests the long note of the flycatcher *Pitangus sulphuratus*. Other sounds are a whining "choo-úr choo-úr" (first note longer than second), a rolling R, and a stopped-up, level, rippling trill.

***Piculus simplex* (Salvin)**

BUGABA WOODPECKER

RANGE: Honduras to western Panama.

***Piculus simplex simplex* (Salvin)**

RANGE: Nicaragua to western Panama.

The distribution of this woodpecker on the Caribbean slope and in the Pacific southwest largely complements that of the congeneric *rubiginosus*. It occurs mostly in the upper tropical and lower subtropical belts, that is, inland and upward on rising ridges and in the foothills, so that the upper portion of its range overlaps the lower portion of that of *rubiginosus*. Except for one report from Bijagua on the Caribbean approach to Miravalles Volcano, it is not known from the northwestern divide.

Compared with *rubiginosus*, it is uncommon or scarce. Like *rubiginosus* it is a forest-based species seen singly or in pairs, mostly a little inside forest, along the forest border, at breaks in the wooded terrain, and in the semi-open, including orchards and plantations beside woodland. Usually it keeps at or below medium heights in trees, on which it pecks and tattoos. In the higher parts of its range I have seen it occasionally with a roving, insect-eating, mixed bird party. Quite noticeably it is one of the few Costa Rican birds with sky-blue eyes (irides).

Its cry, a sort of nasal scream, resembles that of *rubiginosus*, than which it is more drawn out and descends with weakening intensity as it finishes. It is given once or two or three times in succession.

***Celeus castaneus* (Wagler)**

CHESTNUT-COLORED WOODPECKER

RANGE: Southern Mexico to northwestern Panama.

The seldom-seen Chestnut-colored Woodpecker is a Caribbean species found throughout the tropical belt to which it is nearly confined. Here and there it rises, perhaps seasonally, into the lower subtropical belt on the northern and eastern slopes of the Cordillera

Central and probably the length of the Talamanca Cordillera. A report from Bijagua, on the Caribbean slope of the Guanacaste Cordillera, is the only one for the northwestern divide. Apparently a forest-based species, it is met very uncommonly in the interior of forest, in which it frequents as a rule the middle and upper strata, and somewhat less uncommonly in the tree-scattered semi-open beside the forest, where it usually keeps considerably lower in the trees. It is generally seen singly, also in pairs. Its wood-pecking habits do not depart from those typical of the family, yet the bird regularly clings to foliage as does an arboreal ovenbird, and sometimes it moves sideways along a twig.

This species seems to be much scarcer than the congeneric sympatric *loricatus*, even though it is more apt to occur outside the forest proper, hence more easily seen, than the latter bird. On the other hand, *loricatus* appears to be more common because it is noisier and its voice is easily identified. At any rate, I found it much less often than *loricatus* during an entire year spent at a single site in the Sarapiquí lowlands. Interestingly, I did not find it there from mid-April through September, whereas *loricatus* was present the year round. That the bird does occur elsewhere in the Caribbean lowlands during that part of the year is, however, proved by specimens collected in May, June, and July.

The species makes several cries. One is a sharp double squeak. Another begins with a nasal "skahr" and is succeeded on a lower level by a weaker "heh·heh·heh." Another, a sort of yelped and whistled "howp" having the quality of the cry of a trogon, such as *Trogon rufus*, may be given at regular little intervals and is usually followed immediately by a snickering little "frrp" or "fprprp."

***Celeus loricatus* (Reichenbach)**

CINNAMON WOODPECKER

RANGE: Nicaragua to western Ecuador (and Peru?).

***Celeus loricatus diversus* Ridgway**

RANGE: Nicaragua to northwestern Panama.

This brown woodpecker of apparently South American origin and the congeneric

Central American *castaneus* occur as paired species in southern Central America and at the very same sites in Costa Rica. Like *castaneus*, the present species is confined to the Caribbean slope, mostly in the lower tropical belt. That it rises locally to some extent is proved by a specimen taken in the neighborhood of wet and cool Carrillo, which is situated in a low-lying subtropical pocket on the rapidly falling northern slope of the Cordillera Central. Though nowhere abundant, it appears to be most common in the wet-forested northeastern sector (thus including Carrillo) and in the very humid Sixaola region next to Panama. It also occurs, perhaps not uncommonly, between these two areas along wet-forested low ridges merging with the coastal plain. Its center of abundance appears to lie below approximately the 1000-foot mark in the foothills and the fringing flat lowlands.

The Cinnamon in contrast to most Costa Rican woodpeckers is a true inhabitant of forest; sometimes it enters the tree-scattered semi-open at the forest border. Its congeneric neighbor, *castaneus*, is more apt to occur outside forest, yet the two can be found virtually side by side. As a rule it is seen singly or in pairs and generally keeps fairly low in the trees, though rising quite high at times. More often than not it clings to seedlings and bushy growth in forest, its energetic pecks shaking the leafy branchlets. Several times I have seen it pecking away at swollen twig junctions inhabited by ants. Perhaps this foraging tendency helps to remove it from competition with *castaneus*, which seems to prefer sturdier limbs and trunks. I have also observed the Cinnamon spend time pecking a hard trunk with little result, and I watched a male and female (in October) on a rather slender trunk alternate in cleaning a hole and pecking inside the rim. Possibly it cannot carve a cavity in hard wood.

Vocally it is very different from *castaneus*. Its self-identifying "spinking" call, "splink splink·splink·splink·splink," speeding up while falling and weakening, might bring to mind at first that of the hawk *Buteogallus anthracinus*. Also given are a squeaky "tititit-toò," a hard "chikikikrîk," a reedy clinking rattle, a rippling rattle a bit lower-pitched and not so hard as that of the parrot *Ama-*

zona autumnalis, and a "chweé·titit" much like that of the tanager *Piranga flava*.

***Dryocopus lineatus* (Linnaeus)**

LINEATED WOODPECKER

RANGE: Mexico to Bolivia and northern Argentina.

***Dryocopus lineatus similis* (Lesson)**

RANGE: Southern Mexico to northern Costa Rica.

***Dryocopus lineatus mesorhynchus*
(Cabanis and Heine)**

RANGE: Southern Costa Rica and western Panama.

The light-billed northern race, *similis*, enters northern Costa Rica to approximately the mouth of the Gulf of Nicoya on the Pacific slope and possibly to the latitude of Puerto Limón on the Caribbean slope. The dark-billed southern Central American race, *mesorhynchus*, ranges northward to the head of the Gulf of Nicoya and the northeastern Caribbean sector. The overlap is very broad and the distribution complex, as both forms have been taken at the same localities and either crops up in the range of the other. Specimens of intermediate appearance occur throughout the middle third of the country.

The distribution of the species is country-wide from the lowlands to, locally, the lower subtropical belt and occasionally somewhat higher. The bird is generally common downward from the lower limits of the subtropical belt in both the dry and humid life zones. It is typically an inhabitant of tree-scattered clearings, plantations with tall trees and stubs, thinned and open woodland, and wooded streamsides; it is very uncommon to rare inside heavy forest. Though present at almost every locality I visited in its range, it seems with local exceptions to be considerably less abundant than the very similar, sympatric *Phloeocastes guatemalensis*.

Alone or in pairs, occurring at almost all heights, it climbs trunks and good-sized limbs. Its large size and strength open a field of operations shared only by the even larger *Phloeocastes*. Apart from its hammering, the bird attracts attention when, carefully examining a limb and pecking it in tentative

fashion, pieces of rotten bark clatter to the ground. Often keeping its beak partly open, the bird has a cold reptilian look abetted by the humorless small white eye.

Its flicker-like call is similar to that of the conspecific *pileatus* of North America. Given perhaps more commonly is a "squeak-errrrr" or "óook-churrrrr," similar to the call of the Squirrel Cuckoo (*Piaya cayana*), varied to a "chk·urrr" even more like that of the Squirrel Cuckoo. Similar to the last is a woodpecker-like "chiurrrr," of which the staccato "chi" is uttered with the mouth opened and the churring, rattling "urrrr" with the mouth seemingly closed.

***Melanerpes formicivorus* (Swainson)**

ACORN WOODPECKER

RANGE: Western United States to western Panama; Colombia.

***Melanerpes formicivorus striatipectus* Ridgway**

RANGE: Costa Rica and western Panama.

The Costa Rican population of the Acorn Woodpecker has heretofore been known almost exclusively from the central highlands and the mountains extending from the Dota region to the northern tip of the Talamanca Cordillera. The only mention of southern Costa Rica was made in passing by Skutch (1943, p. 363), no doubt in reference to the General-Térraba region. There in the southwest I met the bird only in two well-separated localities: at approximately 3000 feet on Cerro Chirripó and 4000–4500 feet next to the Panama border. As it was abundant at both places I believe its distribution to be more or less continuous, probably along both slopes, from central Costa Rica to western Panama. I also found it high on the Pacific face of the Cordillera de Tilarán, where it was scarce. There is no other report from the northwestern divide.

The species seems to be most common in the upper half of the subtropical belt and in most of the lower montane belt, but it also occurs locally and commonly down to about 3000 feet and upward to and above timber line. It is especially numerous on Irazú Volcano, well into the montane belt. Yet it is strangely lacking on the upper portion of Turrialba Volcano and scarce on the lower slopes; the very few records include none

higher than 4500 feet (Santa Cruz, on the southern slope). The volcanoes Irazú and Turrialba form a saddle-connected massif, and the vegetation seems to be largely the same on both. This anomaly aside, the bird evidently prefers cool, cloud-forested, mountainous terrain where wooded stands alternate with tree- and stub-scattered clearings and pastures. The species is present under these conditions even where deforestation has only recently begun in extensive "wild" areas. It occurs as a rule in groups of several noisy animated individuals at all heights in the trees, sometimes on scrub or a stump. I suspect the groups troop about seasonally. Though it regularly pecks wood, this species also practices a rather accomplished fly-catching. Its silent flight, steadier and straighter than in woodpeckers generally, does not feature hurtling dips, and the bird is capable of rapid series of beats. In the air it flashes a large white wing patch and a white rump.

This woodpecker makes chucking and rattling sounds to which it nods its clownlike head in accompaniment. Its characteristic "rattle," a reedy "hick·a·íck·a·íck·a·íck," brings to mind a tityra or a flycatcher such as *Myiodynastes maculatus* rather than a woodpecker. The bird also makes a stammering, somewhat reedy, parrot-like chatter quite unlike that of the *Centurus* woodpeckers of Costa Rica.

***Centurus hoffmannii* Cabanis**

HOFFMANN'S WOODPECKER

RANGE: Extreme southern Pacific Honduras to northwestern and central Costa Rica.

Hoffmann's Woodpecker, closely related to the *aurifrons* complex, is a representative of the arid Pacific avifauna of northern Central America and Mexico. In Costa Rica it is confined largely to the northwestern quadrant and is common to abundant throughout the Tropical Dry Forest. It follows the scrubby ranch lands upward as far as they go in the lower subtropical belt along the continental divide and in unabated abundance sweeps across the central plateau, rising in diminishing numbers to at least 6500 feet on the neighboring slopes. On the Caribbean side of the plateau region it is found not uncom-

monly at subtropical elevations on Irazú and Turrialba volcanoes and in the Reventazón drainage. Its range ends at the lower limit of the subtropical belt (approximately 2000 feet) at the eastern end of the Cordillera Central. It is relatively uncommon on the Caribbean side where it comes into contact with the more abundant *pucherani* of the humid life zones. Perhaps with spreading deforestation it will descend commonly to lower elevations. On the other hand, I did not find it in the apparently suitable Río Frío region. There are at least two transmontane records from the north side of the Cordillera Central: Carrillo and Guápiles, at the base of the cordillera.

This woodpecker is almost strictly an inhabitant of open and semi-open country. It frequents cattle ranges, clearings, agricultural lands, coffee plantations, and parklike areas. It is seen on medium-sized and small trees, along live fence rows, in very open, low woodland, generally below medium heights. A typical wood-chiseling woodpecker, it also exhibits great interest in the ends of broken limbs. It makes a long chattering rattle that may be accompanied by a violent nodding, a metallic "zick-azick-azick," and it beats a machine-gun-like tattoo.

***Centurus rubricapillus* Cabanis**

WAGLER'S WOODPECKER

RANGE: Southwestern Costa Rica to Colombia and Venezuela; islands off Pacific coast of Panama.

***Centurus rubricapillus rubricapillus* Cabanis**

RANGE: Southwestern Costa Rica to Colombia and Venezuela.

In Costa Rica at its northern geographic limit, Wagler's Woodpecker is sharply restricted to the humid southern half of the Pacific slope. Hence its range neatly complements that of *hoffmannii* in the dry-forested northwest. Occurring primarily in the tropical belt, it appears to be common only in the General-Térraba region, in which there is a good deal of semi-open country. In the heavily forested Golfo Dulce region, I noted it uncommonly, only in mangroves and banana plantations. It rises to an upper limit of perhaps 4500 feet on the slopes and spurs of the Talamanca Cordillera, wherever suitable nonforest habitat is present.

It seems hardly to differ in habitat, actions, and voice from the similar allopatric *hoffmannii*, except perhaps that it tends to cling to foliage as the latter bird apparently does not. Avoiding heavy woodland, it frequents most sorts of nonforested situations, such as cutover areas with scrubby growth, open woodland, savanna type of country, and borders of streams and of agricultural and pasture lands. Hence, though sympatric with *chrysauchen*, which is also confined to the southwest, it hardly competes with the latter species ecologically. It utters a drawn-out churr, a long rattle, several short rattles, often in sets of three, and a *Megarhynchus*-like chatter similar to that of *hoffmannii*.

***Centurus pucherani* (Malherbe)**

PUCHERAN'S WOODPECKER

RANGE: Southern Mexico to western Ecuador.

***Centurus pucherani pucherani* (Malherbe)**

RANGE: Nicaragua to western Ecuador.

Pucheran's Woodpecker is a Caribbean species distributed throughout the tropical belt and in many of the lower portions of the subtropical belt. In lessening numbers it rises higher in the subtropical belt locally along the eastern and southeastern slopes of the Cordillera Central and in the upper Reventazón Valley. In the northwest it slightly overlaps low places along the Guana-caste Cordillera to its Pacific slope under Caribbean climatic influence, but there the bird is local and uncommon to rare. As a very unusual event it has been taken in the general vicinity of San José on the central plateau.

Pucheran's is the most commonly seen woodpecker in most places along the lower Caribbean slope, where it is widespread both in extensively forested and partially or even largely deforested regions. Apparently it is adapted to the moist- and wet-forested life zones, yet cannot be considered an inhabitant of forest, which at best it occasionally enters somewhat on the canopy. It is found in all sorts of semi-open country: openings scattered thickly or thinly with trees, such as tree plantations, abandoned banana lands, and shaded pastures. Here, alone or in two's or

three's, it generally keeps at or below medium heights, sometimes down to shrub level.

It is an active bird that climbs, pecks, probes, and sometimes engages in fly-catching. It investigates the under sides of mossy branches, peers at scaling rotten bark as do many tanagers, and inserts its tongue under loose bark either before or after peering. It clings head downward to pliant leafy twigs and vines, examines the wounded, broken-off ends of twigs, works away at nodes, and drinks from reservoirs in epiphytes and crotches. It utters the usual sort of woodpecker's rattle following a slight introductory catch as well as a smoother, almost churring rattle, perhaps with a "chickling" quality to some of the syllables.

In the month of September I have seen it excavating what appeared to be a nesting hole at a site in the Caribbean lowlands. During the same month, at another site, I made my only observation of what may have been pair-forming behavior. In this instance a bird was dashing about for a considerable length of time in an open grove. It was weaving in and out among the branches and around the tree trunks in an unwoodpecker-like manner, just as lowland swifts (*Chaetura*) sometimes do.

Centurus chrysauchen (Salvin)

GOLDEN-NAPED WOODPECKER

RANGE: Southwestern Costa Rica to Colombia.

Centurus chrysauchen chrysauchen (Salvin)

RANGE: Pacific slope of southern Costa Rica and western Panama.

The Golden-naped Woodpecker is confined to the southern half of the Pacific slope, from the entrance to the Gulf of Nicoya to Panama. Its vertical range extends from the coastal lowlands into the lower subtropical belt, where it is still common at 3000 feet, and to an upper limit of 4000–4500 feet. It is most abundant in the far southwest: the General-Térraba-Golfo Dulce sector.

Ecologically unlike the closely related *pucherani* of the Caribbean slope, it is definitely a forest-based bird that frequents tall solid forest as well as the forest border and the neighboring shaded semi-open. I found it also common, however, in open places along the seashore, perching on bare-branched trees

among canebrakes and in palms. In the forest it generally keeps well up in the trees; outside the forest it may descend much lower. In the deforested areas it probably suffers in competition with *rubricapillus*. The Caribbean *pucherani* is free from competition with any similar species of the semi-open, at least at the lower elevations. Though met singly, the Golden-naped occurs as a rule in pairs or small groups, unlike *pucherani* which is usually scattered individually in a favorable site. It utters a churring note and often several short rattles.

Sphyrapicus varius (Linnaeus)

YELLOW-BELLIED SAPSUCKER

RANGE: Breeds in North America; winters south through Middle America to western Panama.

Sphyrapicus varius varius (Linnaeus)

RANGE: Breeds in Canada and northeastern United States; winters to western Panama and in West Indies.

This, the only migrant woodpecker in Costa Rica, is a rare to uncommon visitant. I have no information on the dates of its arrival and departure. The few records all fit into the winter months. The latest one I know is an observation that I made March 3. Most reports stem from the central highlands, where the species is a regular visitor in small numbers on the volcanoes of the Cordillera Central, especially Irazú.

Ferry (1910, p. 266) collected two birds at Coliblanco, on Irazú, and noted others. Higher on the opposite (northern) slope of the same volcano, I collected one and saw others. These individuals were well separated and foraged independently, for the most part high in tall trees. My other observations were all of lone birds.

Though the species may appear unexpectedly, say, in a park in San José, it evidently prefers to winter higher, in the lower montane and montane belts. I expect it regularly visits the Talamanca Cordillera too, as I saw it there at 4400 feet near the Panamanian border. It seems to prefer thinned mountain forests and heavily shaded parklike areas to solid woodland or pastures with only a few trees, yet I did see one bird in the latter situation. Howell (1953) tabulated the preponder-

ance of females among the Central American migrants of this species. I do not recall seeing an adult-plumaged male in Costa Rica.

Veniliornis fumigatus (d'Orbigny)

SMOKY-BROWN WOODPECKER

RANGE: Mexico to Venezuela and to Bolivia and extreme northwestern Argentina.

Veniliornis fumigatus sanguinolenta (Sclater)

RANGE: Southern Mexico to the Colombian border.

The Smoky-brown Woodpecker is known primarily from the Caribbean slope in the central part of the country, secondarily from the far southwest. Though I consider it basically a subtropical species that reaches an upper limit of at least 6000 feet, it is also common low in the tropical belt on the Caribbean slope, especially in wet areas that front the central highlands. Elsewhere on the lower Caribbean slope I did not happen to find it during a month in the Sixaola region in the southeast, but it was fairly common at Los Chiles in the Río Frío region in the northwest. Along the northwestern divide I met it only at Lake Arenal and on the subtropical Pacific face of the Cordillera de Tilarán, both under Caribbean climatic conditions; there is no report from the Guanacaste Cordillera. On the Pacific side, where it is known from one old report for El General, I met it at extreme upper tropical through lower subtropical-belt elevations in some half dozen localities from the General Valley to the Panamanian border. Here its status varied from uncommon to fairly plentiful.

Throughout its Caribbean range as presently established, the Smoky-brown is the only small-sized woodpecker. In the southwest it seems to be quite absent from the tropical-belt elevations inhabited by the congeneric *kirkii* (apparently also in the extreme southeast). If this woodpecker is judged by the habitats it frequents, where it is regularly met, and where on the Caribbean slope it seems to be equally common at lower and higher elevations, it evidently inhabits a greater variety of environmental situations at cooler altitudes than in the tropical belt. Nowhere, however, is the bird an inhabitant of forest notwithstanding its occurrence in forested areas. At middle altitudes the hilly

topography is necessarily broken, and here the bird occurs at the borders of and breaches in forested country. Though fairly common over much of the lowlands, it avoids woods and is uncommon to rare or lacking in suitable habitat in extensively forested tracts.

For the most part it frequents new second growth, tall thickets, woodland edges, and overgrown borders of one sort or another intermixed with saplings and bigger trees and vine tangles. Occasionally it enters the tree-scattered semi-open beside secondary growth. Usually it is seen singly, also in pairs, rather low, perhaps down to eye level, in the second-growth habitat; here it pecks vigorously the thickety stems, slender branches, and narrow boles. In leafy shrubs and taller trees it may move amid the foliage like an arboreal ovenbird. In general, the erectly postured bird hitches itself up and along inclined branches and stems in typical woodpecker fashion, that is, with the rear end of its body seemingly attached and the front end clearly free of contact.

Its harsh buzzy rasping call, a series of up to 10 notes or so, is a rapidly given "zur zur zur zur," and so on (or "djí" or "zhí"). It may be varied to a "tchip, tchip, zr·r·r·r·r·r üh küh·küh·küh·küh·küh·küh." Also given are a metallic, woodpecker-like "tchip," a hard "tsick" or "tseck," a loose "chick" or "tsick," and a continuous grating, "twickering" call.

Veniliornis kirkii (Malherbe)

RED-RUMPED WOODPECKER

RANGE: Costa Rica to western Ecuador and the Venezuela-British Guiana border, also Trinidad and Tobago.

Veniliornis kirkii neglectus Bangs

RANGE: Southern Costa Rica and western Panama.

This South American species, here at its northern limit, barely enters Costa Rica, whence it has been recorded in the past from only two sites, both in the lower Térraba Valley of the Pacific southwest. (Pozo Azul de Pirris in Carriker [1910, p. 590] is a slip of the pen for Pozo del Río Grande [de Térraba].) Carriker (*loc. cit.*), Bangs (1907b, p. 293), and Cherrie (1893, p. 46) all remarked on the scarcity of this bird. Personally, I met it in

the southwest only south of the Térraba Valley: the Coto district on the mainland side of the Golfo Dulce and Rincón on the peninsular side at the head of the Golfo Dulce, in both of which lowland areas it was uncommon, and also at 1500 feet overlooking the Coto Brus Valley, where it was fairly common. In addition, I found it uncommon at a heavily forested site in the extreme southeast: the uninhabited Río Suab, a tributary of the Río Yorkín, in the tropical-belt foothills of the Sixaola region.

In my experience this small woodpecker, quite unlike *fumigatus*, is a tropical-belt inhabitant of tall humid forest, either virgin or selectively logged, beyond the borders of which it does not stray. It keeps as a rule above medium heights in the trees, even in the crowns, where, if not for its cry, the bird would usually pass unnoticed; it also occurs lower, of course. I met it usually alone, also in two's, and Carriker (*loc. cit.*) collected three birds from the same tree. It is typically a hammering woodpecker that also beats a tattoo. When the bird climbs or chisels, its red rump is normally concealed by the almost overlapping folded wings, which are touched with brown as in the superficially similar *Piculus simplex*. I seldom caught the red flash from birds in flight high above me.

Its voice is completely different from that of *fumigatus*. A single note, a nasal resonant "keer" of weakening intensity, brings to mind the long note of the flycatcher *Pitangus sulphuratus* and the "keek" of *Piculus rubiginosus*. Another is a strong, tapered, jaylike or gnatcatcher-like "myehh." Its insistent call consists of two to usually four consecutive notes, nasal, catlike, and tapering, similar to the "keer," ending uniformly either with or without a much weaker, sawing and throaty "yuk" or "yk."

***Dendrocopos villosus* (Linnaeus)**

HAIRY WOODPECKER

RANGE: North America south to western Panama; Bahamas.

***Dendrocopos villosus extimus* Bangs**

RANGE: Costa Rica and western Panama. The Costa Rican Hairy Woodpecker is restricted to the mountainous central and southern parts of the country. Most records

are from the central highlands, including the Dota region. Although known from only two places on the Talamanca Cordillera (the northern sector where crossed by the Inter-American Highway and Ujarrás de Térraba in the southwest), it probably occurs sparingly all the way to Panama. There is no report from the northwestern divide, from which the bird is probably indeed absent.

A common bird in its range, it is most numerous on the Cordillera Central, where it is an inhabitant of the highlands above 5000–6000 feet to timber line; it is not restricted to a particular slope. There are also several records from the upper subtropical belt on the Caribbean approaches to the Turrialba-Irazú massif and a couple from the central plateau proper. It is seen mostly in tree-scattered clearings, park-like pastures, and recent openings; it will almost surely increase in numbers along the Talamanca Cordillera as the forests are removed. At the higher elevations it is the most common woodpecker. In the montane belt the only other species are *Melanerpes formicivorus* and the migrant *Sphyrapicus varius*.

It occurs singly, in pairs, and sometimes in small noisy groups the members of which chase one another and fly about a good deal. It is not shy. Usually it keeps below medium heights on bare stubs and in the densely foliated, epiphyte-covered trees. It regularly descends to shrubs and stumps, and I have seen it close to the ground in low tangles. In addition to pecking wood, it clings to vines, along which it may move sideways like a xenops.

It makes a rapid, typically woodpecker-like rattle and another with a "chickling" quality. Not dissimilarly it utters a strong rattling or chattering "íck a·íck·a·íck·a íck·a·íck·a·íck" that squeaks like a polished table being rubbed with a damp rag. It also gives a bicycle-horn "squick."

***Phloeocastes guatemalensis* (Hartlaub)**

FLINT-BILLED WOODPECKER

RANGE: Northern Mexico to western Panama.

***Phloeocastes guatemalensis guatemalensis* (Hartlaub)**

RANGE: Southern Mexico to western Panama.

This very large woodpecker of country-wide distribution is common over most of its range from the lowlands to the lower limits of the subtropical belt and reaches the lower montane belt locally in the central highlands. It is least abundant in the Tropical Dry Forest, but even there it is not uncommon in stands of edaphically moist woodland. It is virtually absent, however, from most of the deforested central plateau.

The Flint-billed is almost always found in the same localities with the convergently similar *Dryocopus lineatus*. It occurs not only in the semi-open, as does *Dryocopus* more abundantly, but it is also a true inhabitant of tall virgin forest, a habitat in which *Dryocopus* is very scarce and largely out of its element. Yet many a time the two species are found almost literally side by side. I assume that *Phloeoceastes*, the heavier, stronger bird, is capable of excavating prey which *Dryocopus* cannot. Probably of greater significance is a basic difference in their food habits that remains to be discovered in Costa Rica. The Flint-billed is in most places the more abundant of the two, most noticeably along the northwestern divide.

The species is apt to occur at any height in the trees, from very high in tall ones down to stumps and the bases of trunks, both inside the forest and beside it in the tree-scattered semi-open. Mostly it frequents good-sized trunks and sturdy boughs, pecking or hammering vigorously or prying away loose bark, but it also works on slender boles. Not shy as a rule, it can often be observed closely in two's, of the same or opposite sexes, and not uncommonly in three's or sometimes four's. It is not unusual to encounter two birds, both males, chiseling away within a foot of each other on the same tree. Like *Dryocopus* it flies in exaggerated eye-catching bounds befitting its size, silently or with a heavy whir.

This powerful woodpecker is responsible for one of the characteristic woodland sounds, a loud double rap which identifies it sight unseen. Vocally, too, it is very different from *Dryocopus*. It makes a reedy rattle that sounds as though the reed were not only loose but about to fall out; on occasion it is continued stutteringly for a while. Also given is a rapid "heh · heh · heh," and so on, like the comical type of cackle made by woodpeckers in animated cartoons.

PASSERINES

SUBOSCINES

FAMILY DENDROCOLAPTIDAE

Dendrocinclá fuliginosa (Vieillot)

BROWN DENDROCINCLA

RANGE: Honduras to Bolivia and extreme northeastern Argentina.

Dendrocinclá fuliginosa ridgwayi Oberholser

RANGE: Honduras to western Ecuador.

This furnariid-like woodhewer is virtually restricted to the Caribbean slope, mostly in the tropical belt. In diminishing numbers it rises into the lower portion of the subtropical belt and barely laps over the northwestern divide above 1500 feet on its Pacific side. The species seems to be either locally migratory or to wander after the close of the breeding season; it is not encountered regularly anywhere. Its over-all status fluctuates from uncommon to fairly common.

The bird is usually seen below medium heights in the trees, either alone or in small

groups attending army ants. It leaves the forest a few yards for the semi-open only when following the ants part way across a clearing. Unlike a typical woodhewer, the bird sometimes perches in a "normal" manner, when it resembles an ovenbird in the absence of recurved tail spines, the obtuse angle sometimes formed between body and tail, and the contrast between brown body and reddish tail.

Its usual note is a metallic squeak, like a grating hinge. The bird also has a harder call note and a nasal rippling "laugh."

Dendrocinclá anabatina Sclater

TAWNY-WINGED DENDROCINCLA

RANGE: Southern Mexico to western Panama.

Dendrocinclá anabatina anabatina Sclater

RANGE: Southern Mexico (except Yucatan) to western Panama.

The Tawny-winged *Dendrocinclá* is a

southwestern species known from the mainland side of the Gulf of Nicoya southward to Panama. It occurs primarily in the humid forests of the tropical belt, most commonly in the coastal lowlands, and is one of the few woodhewers that I have found in mangroves. It rises in diminishing numbers to at least 4000 feet in the Térraba watershed and to 4500 feet beside the Panamanian border.

It usually occurs fairly low in the trees, generally in lively groups the members of which boldly chase one another about and call continually. Often accompanying army-ant columns together with the ever-present ant-bird *Gymnopithys leucaspis*, they snatch flushed invertebrates from the ground, pick them off stems and the lower trunks, and flutter for insects on the under sides of leaves. Clinging to or climbing the trunks and limbs, the birds constantly flick or partially open their wings. Excited individuals often raise their short shaggy crown feathers, but I do not recall seeing the buff throat conspicuously puffed. This species would appear to differ from *fuliginosa*, its Caribbean counterpart, in being noisier, not so shy, more abundant, more acrobatic, and perhaps also in dropping more frequently to the ground for prey. Its usual note is a reedy, sometimes quavering "squirp"; its call is a long-drawn softened rattle.

***Dendrocincla homochroa* (Sclater)**

RUDDY DENDROCINCLA

RANGE: Southern Mexico to Colombia and western Venezuela.

***Dendrocincla homochroa acedesta* Oberholser**

RANGE: Southwestern Nicaragua to western Panama.

The Ruddy *Dendrocincla* occurs on both sides of the country, but seems to be primarily a Pacific species. It is known from several localities in the Tropical Dry Forest, but is much more common on the neighboring slopes of the northwestern divide. In the southwest it inhabits the upper tropical belt and, in increasing abundance, the subtropical belt from the General-Térraba region to Panama. It appears to have spread through gaps that flank the northwestern volcanoes to the northern two-thirds of the Caribbean side. There it is met occasionally in the subtropical

belt from the Guanacaste Cordillera to the Cordillera Central and in the foothills east of the central plateau. Though not recorded from the southeast, it probably occurs along the Talamanca Cordillera. Ecologically it is, on the one hand, restricted to cool subtropical forest in contrast to its tropical-belt congeners; on the other hand it occurs in the dry-forested northwest as the only member of its genus.

Its general habits are like those of the other two *dendrocinclas*. Often attending army ants, the bird forages on the lower parts of tree trunks, sometimes alone but more commonly in groups and together with other species. Its stiff tail serves as a prop, and the bird constantly flicks its folded wings. It has a hammerheaded appearance in life not apparent in museum specimens, and it may show a gap in the nuchal feathering. Its vocabulary contains reedy, scratchy, or squeaky notes, a chattering and a churring rattle, and a grating-pulley sound.

***Deconychura longicauda* (Pelzeln)**

LONG-TAILED WOODHEWER

RANGE: Extreme southeastern Honduras to Bolivia and Mato Grosso.

***Deconychura longicauda typica* Cherrie**

RANGE: Extreme southeastern Honduras to northwestern Colombia.

Although it occurs on both sides of the country, this rather small woodhewer is met with some frequency only southward from the Térraba region. On the Caribbean slope it is known from only half a dozen localities scattered over the northern and eastern foothills of the Cordillera Central, mostly in the upper tropical and lower half of the subtropical belts. On the Pacific slope it is confined to the southern half of the country, from the entrance to the Gulf of Nicoya southward. It is most common, but by no means abundant, at tropical-belt elevations on both sides of the Golfo Dulce. It rises in diminishing numbers to 4500 feet here and there on the approaches and slopes of the Talamanca Cordillera.

In size, habits, and habitat it is not dissimilar to another small woodhewer, *Sittasomus griseicapillus*. The latter, however, is largely absent from the center of abundance of

Deconychura in the far southwestern lowlands. The still smaller *Glyphorhynchus* does occur with it, irregularly and unpredictably.

It is virtually restricted to humid virgin forest and its borders, where it forages for the most part on the lower portions of the tree trunks, often at eye level. Occasionally I have seen it anting with some small insect too stout-bodied to be an ant. It is usually seen alone, rarely in two's. Its seldom-heard call is a continuous, weakly clipping "chih·chih·chip·chip·chih·chih," and so on.

***Sittasomus griseicapillus* (Vieillot)**

OLIVACEOUS WOODCREEPER

RANGE: Central Mexico to Bolivia and northern Argentina.

***Sittasomus griseicapillus sylvioides*
Lafresnaye**

RANGE: Southern Mexico to Costa Rica (and undoubtedly adjacent Panama).

The small Olivaceous Woodcreeper lives in two different climatic zones. Inhabiting, on the one hand, the humid subtropical belt along both slopes, it is fairly common along the Caribbean periphery of the central highlands, particularly Cartago Province east of the central plateau, but its range stops well short of Panama. It is considerably more abundant on the Pacific side, where its range extends the length of the country from the Guanacaste Cordillera to the Panamanian border. Though occurring in humid and cool primary-forested areas, it is usually found at cuts, trails, edges, woodland openings, and in forest without a closed canopy.

By contrast, the species also inhabits the relatively dry forests and semi-open woodland in the northwestern Pacific lowlands—an inhospitable region for woodhewers. It becomes more common upward from 1500 feet or so at the base of the continental divide, where the habitat is still of the sub-humid Guanacaste type: partially cleared ranch lands with scrubby small-leaved trees, bushes, thickets, and grass. A little higher the transition to the humid-forested subtropical belt is abrupt, but the bird passes it smoothly, perhaps with an increase in numbers.

Like many woodhewers, it is seen singly and, during the breeding season, also in two's. It spends the day climbing trunks and creep-

ing along branches, usually not above medium heights in the trees. A more active bird than the larger woodhewers, it sometimes sallies acrobatically for a dislodged flying insect. Its call, a rushed, woodpecker-like, rattling trill, is similar to that of the ovenbird *Xenops minutus*, with the sharp edges of the latter worn off and of the same general type as that of the piculet *Picumnus olivaceus* and the manakin *Pipra coronata*.

***Glyphorhynchus spirurus* (Vieillot)**

WEDGE-BILLED WOODHEWER

RANGE: Southern Mexico to Bolivia and Brazil.

***Glyphorhynchus spirurus sublestus* Peters**

RANGE: Costa Rica to western Ecuador and western Venezuela.

The little Wedge-billed is primarily an inhabitant of the humid-forested tropical belt on both slopes; it is not known from the Tropical Dry Forest. It is common throughout the Caribbean lowlands and laps onto the Pacific face of the northwestern divide; it is not nearly so common in the Pacific southwest. In diminishing numbers it rises to 3000 feet or so, seldom above 3500 feet, in the subtropical belt. A forest bird, it also occurs in thinned woodland and at the forest border. It seldom makes as much as a five-second flight into the semi-open. I have seen it far from woods only in the Río Frío region.

While common, it is not of regular occurrence, and its distribution is often spotty even in apparently suitable areas. But should one bird be found, others are almost certain to be present. Usually it is met singly; a few individuals may, at times, be seen foraging independently at the same site. Normally its actions do not claim one's attention. The bird keeps low, does not often creep along branches, and generally it prefers thick trunks to slender ones. Possibly it finds more to eat on the rough bark of thick trunks than upon smoother-barked young trees when these are not mossy. It climbs in agile spurts and flies in long wing-driven dips. On occasion, as might be expected from the shape of its beak, the bird pecks like a piculet or xenops.

The undistinguished warbler- or swallow-like call notes may be accompanied irregularly by a nervous flicking of the wings. What

may be the "song" is a rising series of bubbly, weak, pleasant "twick" 's or "yik" 's, with the "k" 's loose.

***Xiphocolaptes promeropirhynchus* (Lesson)**

GREAT-BILLED WOODHEWER

RANGE: Southern Mexico to Venezuela and Bolivia.

***Xiphocolaptes promeropirhynchus costaricensis*
Ridgway**

RANGE: Costa Rica.

The endemic Costa Rican race of this very large woodhewer is known only from the slopes and foothills of the central highlands. Restricted to the Caribbean versant, it occurs along the northern and eastern sides of the Cordillera Central and at the headwaters of the Río Reventazón adjacent to the northern end of the Talamanca Cordillera. The known localities all lie in very wet portions of the forested subtropical belt. The bird seems to be confined to forest and is seen rarely, either singly or in two's. In typical woodhewer fashion it climbs the trunks of trees, often starting at the very base.

***Dendrocolaptes certhia* (Boddaert)**

BARRED WOODHEWER

RANGE: Southern Mexico to Bolivia and northern Brazil.

***Dendrocolaptes certhia sanctithomae*
(Lafresnaye)**

RANGE: Southern Mexico to Panama.

***Dendrocolaptes certhia hesperius* Bangs**

RANGE: Southwestern Costa Rica.

The Barred Woodhewer inhabits the humid-forested life zones on both slopes, mostly in the tropical belt; it becomes uncommon above 2000 feet, rare above the middle of the subtropical belt. It is present but scarce or at best uncommon in the northwestern Pacific lowlands, but increases in numbers in the upper tropical and lower subtropical belts along the adjacent continental divide; these birds belong to the Caribbean population. The species seem to be generally more abundant on the Caribbean than on the Pacific slope, where it is common only in the more humid portions of the far southwest.

The Barred is primarily a forest-inhabiting woodhewer that enters open woodland and shaded plantation type of country. It is typically a climber of trunks and limbs, though not an especially active one. It often occurs in two's, also singly, sometimes in three's, usually below medium heights. Preying on invertebrates and cold-blooded small vertebrates, it is regularly found attending army ants as a predictable temporary visitor, not as a persistent follower. It may cling immobile to a trunk while the observer passes it by. Its simple call, a single note two or three times repeated, is a distinctive slow-twanging "oi" changing into an inhaled "ink." Sometimes this call falls to pieces, so to speak, degenerating into quick scratchy "oink" 's, followed by other scratchy sounds. I have heard no call note other than a single "oiyñk" (or "awwýnk").

The race *hesperius* differs from *sanctithomae* in having a duller crown and narrower barring of the under parts. The narrower barring imparts a dusky appearance to the breast, so that birds from the Térraba-Golfo Dulce region are generally separable. I cannot, however, assign racially many Costa Rican specimens of unspecified locality.

***Dendrocolaptes picumnus* Lichtenstein**

BLACK-BANDED WOODHEWER

RANGE: Southern Mexico to Bolivia and northwestern Argentina.

***Dendrocolaptes picumnus costaricensis*
Ridgway**

RANGE: Costa Rica and western Panama.

This large woodhewer, ranging from the upper half of the subtropical belt to the lower limits of the montane belt, is known only from the highlands in the central and east-central parts of the country. It is confined largely to the Caribbean foothills of the Cordillera Central and the mountains that border the central plateau at its southeastern edge, but it is present also in the mountains of the Dota region. It has not been recorded from the Talamanca Cordillera proper, along which it probably occurs into Panama, but I did find it on the northeastern approach. There is no record from the Cordilleras de Guanacaste and de Tilarán, where it probably does not occur. The species is evidently

restricted to wet forest at cool temperatures. It seems to keep higher in the trees than most woodhewers in Costa Rica, and it is met singly and seldom. It replaces at higher altitudes the congeneric *certhia* of the tropical and lower subtropical belts.

***Xiphorhynchus guttatus* (Lichtenstein)**

BUFF-THROATED WOODHEWER

RANGE: Guatemala to Bolivia and southern Brazil.

***Xiphorhynchus guttatus costaricensis*
(Ridgway)**

RANGE: Southeastern Honduras to western Panama.

The species is distributed over most of the country, primarily in the humid life zones and most abundantly in the tropical belt. It is rare in the Tropical Dry Forest (a poor region for woodhewers) where it is apparently not known north of the lower Tempisque basin. It rises commonly to the lower subtropical belt, uncommonly higher. It laps over the Pacific slope of the Cordillera de Tilarán in the northwest, but is nearly absent from the Guanacaste Cordillera, owing perhaps to competition by the congeneric *flavigaster*. Preferring thinned woodland and plantation type of country to heavy forest, it shares much of its range with the smaller, thinner-billed *Lepidocolaptes souleyetii*. Normally these are the only woodhewers likely to be present in semi-open areas, and they are probably the two most numerous ones in the country as a whole. Only in the Golfo Dulce region did I find the Buff-throated behind the forest border as well as in mangroves.

The habits of this bird do not depart from the woodhewer norm. As do others in its family, this one also pecks. Mostly it is met alone; on occasion, two individuals cling or forage in proximity on the same trunk. This species might perhaps be characterized by its nonforest habitat and the exceptionally free use of its voice. Probably the noisiest woodhewer in the country, it utters several recognizable sounds. The call is a descending series of plaintive "wick" 's, each gradually losing intensity. Other cries include a low-twanging single note, as if plucked on a bowstring, an upturned whining note, and a tireless chirking

chatter. Birds frequently call within easy ear-shot of one another.

***Xiphorhynchus flavigaster* Swainson**

IVORY-BILLED WOODHEWER

RANGE: Northern Mexico to northwestern Costa Rica.

***Xiphorhynchus flavigaster eburneirostris*
(Des Murs)**

RANGE: Southern Mexico to northwestern Costa Rica.

***Xiphorhynchus flavigaster ultimus*
Bangs and Griscom**

RANGE: Nicoya Peninsula, Costa Rica.

The Ivory-billed Woodhewer is at its southern geographic limit in northern Pacific Costa Rica. The isolated *ultimus* is known from three localities in the Nicoya Peninsula. A specimen from Bahía de Salinas, near Nicaragua, belongs either to this form or introgresses with *eburneirostris*. I did not meet with *ultimus*, which may be confined to moist forest in low mountains or to edaphically moist associations in the dry-forested lowlands.

The distribution of the nominate race, *eburneirostris* (*X. f. eburneirostris* × *ultimus*, according to Wetmore and Parkes [1962, pp. 58, 59]), is zonal along the forested slopes of the Guanacaste Cordillera between 400 and 3000 feet above sea level; there is no report from the Cordillera de Tilarán. In addition, I met it once at Los Chiles on the Caribbean slope just south of Lake Nicaragua. The bird is of local occurrence, and its over-all status varies from very uncommon to very common. It is generally found in high forest and its immediate vicinity both in the lower and drier and in the higher and wetter parts of its range; at Los Chiles, however, it was beside subforest. Usually it keeps from medium heights to very high in the trees, creeping actively along limbs more consistently than upon the trunks; sometimes, of course, it goes lower. It is seen singly, less often in separated two's.

Eburneirostris utters a distinctive "laughing" call which, in its entirety, begins on a level plane, then bounces downscale while accelerating and weakening, as does the call of the antshrike *Taraba*, for instance. Often

it is shortened to a descending "weeyÿÿ-ÿÿÿÿ" or "youyouyouyouyouyou," something like a musical whinny. A less frequent, alternate call is a drily rattling one, like that of a woodpecker or an ovenbird. The call note is a "squirp" or "skwowrp."

***Xiphorhynchus lachrymosus* (Lawrence)**

BLACK-STRIPED WOODHEWER

RANGE: Nicaragua to northwestern Ecuador.

***Xiphorhynchus lachrymosus lachrymosus*
(Lawrence)**

RANGE: Nicaragua to western Colombia and northwestern Ecuador.

The Black-striped Woodhewer is confined to luxuriant forest along both slopes, thus excluding the subhumid Pacific northwest, and it is most abundant below the 1000-foot mark. Only in the General-Térraba-Golfo Dulce sector is it common higher in the tropical belt; only there and on the Pacific slope of the Guanacaste Cordillera is it known from the subtropical belt. Of spotty distribution, the bird is either abundant locally or met irregularly even in apparently suitable areas.

As a rule it keeps fairly high in forest, where it is seen singly from time to time. Also, I found it common in the mangroves at the head of the Golfo Dulce. It enters regularly into the neighboring well-shaded semi-open, where it often occurs much lower on the trunks, is more easily seen, and tends to be gregarious with its own kind. These small groups of somewhat separated individuals give the impression that they travel about. The foraging habits of this brightly marked species are those of a typical woodhewer.

The bird utters several different sounds. The most striking, "weé hir·hir," is a sort of mad laugh having the quality of an icterid such as *Cacicus uropygialis*. An arresting cry, it brings to mind that of a neighbor, the cotinga *Lipaugus unirufus*. What may be the "song" is a descending series of notes similar to the nasal musical whinny of the congeneric *flavigaster*. Another call is a whining chatter, like that of an antwren (*Myrmotherula axillaris*). Its call note, a twanging cry that rises in an arc, resembles that of the Barred Woodhewer.

***Xiphorhynchus erythropygius* (Sclater)**

SPOTTED WOODHEWER

RANGE: Southern Mexico to western Ecuador.

***Xiphorhynchus erythropygius punctigula*
(Ridgway)**

RANGE: Southern Nicaragua to western Panama.

The Spotted Woodhewer is one of the common birds of the humid-forested subtropical foothills and slopes the length of the country. It is absent from the Tropical Dry Forest and the central plateau. Most abundant between 2500 and 4500 feet above sea level, it barely rises into the lower montane belt and descends below the upper limits of the tropical belt uncommonly on the Caribbean slope, rarely in the Pacific southwest. A forest inhabitant, it also frequents forest borders and thinned woodland drenched in mist and covered with epiphytes.

The bird is seen singly, as are many other woodhewers, but it also forms small bands as do the dendrocinclos. Whether alone or in groups it often travels or wanders about. On the Caribbean side, individuals regularly attach themselves to a trooping band of the grosbeak *Caryothraustes poliogaster*, even in the lower tropical belt, provided there are foothills. This is the only Costa Rican woodhewer, to my knowledge, that travels with mixed parties very high in the trees, although several members of the family may join other birds attending legionary ants in the understory. It associates also with groups of antwrens and antvireos in the upper understory in forest. Its foraging habits do not differ from those normal to the family, but the bird does exhibit a special interest in epiphytes.

Its self-identifying "song" is a series of two to several prolonged sad notes that taper downward and are successively lower pitched. These desolately whistled sighs are one of the mysterious sounds of the cool subtropical forests.

***Lepidocolaptes souleyetii* (Des Murs)**

THIN-BILLED WOODHEWER

RANGE: Southern Mexico to northern Brazil and northwestern Peru.

Lepidocolaptes souleyetii compressus
(Cabanis)

RANGE: Southern Mexico to western Panama.

The Thin-billed Woodhewer is widely distributed along both slopes from sea level through the subtropical belt or even higher on the mountainsides that face the central plateau. Above the tropical belt, however, its numbers decrease sharply. The most common woodhewer in Costa Rica at the lower elevations, it can be seen regularly even in the dry-forested Pacific northwest. It barely penetrates the edge of solid woods, but is abundant in thinned woodland, parklike areas, plantations, and abandoned agricultural lands with shade trees. In these man-made environments, so uncongenial to most members of its family, the species thrives. Apparently the presence of the semi-open habitat accounts for the presence of the bird in different life zones. Nevertheless it meets an altitudinal barrier at about the frost line or its equivalent.

The bird is seen alone, also in two's and three's, especially during the breeding season. It explores the trees from the lower trunks to medium heights or higher. Sometimes it playfully juggles a hard-bodied insect from the tip of the bill to its mouth. Other woodhewers may do so, too, but less frequently. It also flakes bark. This species seems to be more active than many of the others, and it is not obviously disturbed when closely watched.

Its often-heard call is a simple, descending, pleasingly musical trill of variable strength; sometimes it is shortened and weakened intimately, so to speak. Two birds, probably a mated pair, may call and answer each other either with the full-voiced trill or a constant soft trilling.

Lepidocolaptes affinis (Lafresnaye)

ALLIED WOODHEWER

RANGE: Northeastern Mexico to Venezuela and Bolivia.

Lepidocolaptes affinis neglectus (Ridgway)

RANGE: Costa Rica and western Panama.

The species inhabits the core of mountains through the central and southern parts of the country; there is no record from the north-

western cordilleras. Ranging from a low of about 4000 feet (although reported down to 2500 feet [Carriker, 1910, p. 656]) to timber line, it becomes more and more common upward from 4500–6000 feet to its center of abundance in the montane belt. It is largely absent from the central plateau, but present on the neighboring rising slopes.

The Allied is the only woodhewer that inhabits the very high altitudes. In the upper middle altitudes only *Dendrocolaptes picumnus* and *Campylorhamphus pusillus*, both rarely seen, may occur with it. In the lower middle altitudes, where the Allied becomes rare in most places, a few other rarely seen woodhewers may be present as outlying representatives of a family which, as a whole, barely rises above the subtropical belt in Costa Rica. Vertically, the Allied and the congeneric *souleyetii* are scarce in their zone of overlap.

The bird is met along forest borders, in patches of woodland, parklike highland pastures, small clearings with trees, and at openings rather than inside virgin forest. It is seen singly and in two's usually fairly high in the trees, also down to shrub height. It behaves no differently from the general run of woodhewers. Its voice bears no resemblance to that of *souleyetii*. Three of its calls, to my ear, are distinctive but not diagnostic. One is a three-note set of reedy squeaks. A quite different two-note cry is similar to that of the antwren *Myrmotherula axillaris*. The third is a little laugh, like that of a Hairy Woodpecker, introduced by an aspirated "ah."

Campylorhamphus pusillus (Sclater)

BROWN-BILLED SCYTHEBILL

RANGE: Costa Rica to western Venezuela and western Ecuador.

Campylorhamphus pusillus borealis Carriker

RANGE: Costa Rica and western Panama.

The scythebill is known mostly from the northern and eastern approaches to the Cordillera Central and the hills south and east of the central plateau, including the Dota region. Elsewhere, it has been found occasionally only in the far southwest. There is no record from the southeast, where the bird un-

doubtedly occurs, nor from the Pacific northwest, where it is almost surely lacking.

Carriker (1910, p. 658) believed that it occurs throughout the Caribbean lowlands and to be most abundant in the vicinity of Guácimo, El Hogar, Jiménez, and Guápiles. These localities, situated at the northern foot of the Cordillera Central, I regard as clinging to the skirt of the Turrialba-Irazú massif. In my experience the bird is most common in the subtropical belt, from which it ranges up to 7000 feet or more in the mountains; it has been found in the coastal lowlands only in the southwest. The species seems to be small in total numbers, thinly dispersed, solitary, and is seldom encountered.

The bird forages less in deep forest than along its borders, in woodland openings, and in small clearings with trees, primarily in brokenly forested, hilly terrain. An active bird usually moving about the countryside, it may cover appreciable distances either alone or accompanying a mixed bird party traveling through the trees. Possibly it follows foraging rounds in which it seeks to feed on certain palms, as noted by Carriker and as I have seen it do. Its climbing habits are those of a typical woodhewer, and the bird frequents the trees at almost all heights. Unlike the other woodhewers of Costa Rica, it sometimes investigates a fallen trunk. The sickle-shaped bill should be of advantage to a bird that, clinging to a round log or the bole of a tree, attempts to probe a curved surface without contorting its neck.

Its distinctive cry is by far the longest and most involved of any native woodhewer. It is a two-part "wheé whipwhipwhipawéé, at·t·t·t·t·weeawééawéé." It may be shortened to "whip, awheé awheé awheé" and altered so that the notes pass successively downscale as in the Spotted Woodhewer.

FAMILY FURNARIIDAE

Synallaxis albescens Temminck

PALE-BREADED SPINETAIL

RANGE: Costa Rica to Bolivia and central Argentina.

Synallaxis albescens latitabunda Bangs

RANGE: Southwestern Costa Rica (and probably adjacent Panama).

This South American spinetail reaches its

northern limit in southwestern Costa Rica. It is largely restricted to the Térraba region, where it is most numerous in the vicinity of Buenos Aires and fairly common at Boruca. It has also been taken on the gulf coast of the Osa Peninsula (Puerto Jiménez), and I found it at 1200 feet beside the Río Coto Brus and at 4500 feet at Cañas Gordas next to Panama. Confined to the savannas, which spread like gulfs and flow like rivers through woodland, and to similar habitat, the bird frequents the clumped grass and wiry shrubs.

It meets the congeneric *brachyura*, from which it differs in appearance, voice, habitat, and habits, along the savanna edges. Compared to the creeping, thicket-haunting *brachyura*, it is an open-country bird that flies readily for distances up to several rods before dropping into grass or disappearing in a bush. Its lively actions approach those of the free-living seedeaters and grassquits on the one hand, and of another neighbor, the yellow-throat *Geothlypis poliocephala*, of more or less fixed abode on the other hand. Although single individuals appear to be sedentary, groups of three or four circulate in foraging rounds.

Its voice is completely different from that of *brachyura*. The usual call is an unclear but diagnostic "wa-tér." Another note, "chik" (or "ek"), is like the sound of a little dog.

Synallaxis brachyura Lafresnaye

SOOTY SPINETAIL

RANGE: Honduras to western Ecuador; also central Brazil.

Synallaxis brachyura nigrifumosa Lawrence

RANGE: Honduras to western Ecuador.

The Sooty Spinetail is distributed in the humid life zones along both slopes and is most abundant in the tropical belt. On the Caribbean side it rises in lessening numbers, although locally common, to the central plateau. Not so common on the Pacific slope, where it occurs from the entrance to the Gulf of Nicoya southward, it hardly rises above the tropical belt. Yet, in the Térraba region, I found a tiny isolated colony in an opening amid hilly forest at an altitude of 4000 feet.

One of the common birds of Costa Rica at the lower elevations, usually found alone or in two's, it is a sedentary inhabitant of

shrubby low growth, hedges and thickets, vegetation-choked ditches, overgrown roadsides, and other ground cover generally unshaded by taller growth; it does not enter woodland. It skulks like a wren in the tangled grass and low thickets or moves about deliberately and rests calmly inside a bush. Occasionally it rises to the lower branches of young trees. Should its habitat be invaded by army ants, it utilizes this opportunity to secure prey. It seldom resorts to flight unless flushed or to cross a small opening. Its rapidly fluttering wings carry it slowly on an even keel as its legs dangle in the strained manner of a little rail. A characteristic pose is one in which it peers about with lowered head while cocking its spiky tail and flicking its wings.

The bird utters commonly a self-identifying, heavy, broken churr that bounces downward while increasing in speed and weakening in strength, as well as a prolonged noisy "ch-ch-ch-churrr·r·r·r" similar to that of the little rail *Laterallus albigularis* or the little grebe *Podiceps dominicus*. A few less distinctive single notes are also given.

The race *chapmani*, described for southwestern Costa Rica by Bangs and Penard (1919, p. 25), I cannot separate from *nigritumosa* by criteria of color or measurements.

***Cranioleuca erythrops* (Sclater)**

RED-FACED SPINETAIL

RANGE: Costa Rica to western Ecuador.

***Cranioleuca erythrops rufigenis* (Lawrence)**

RANGE: Costa Rica and western Panama.

The Red-faced Spinetail is restricted to the cool and wet middle altitudes from the upper half of the subtropical belt to the montane belt; a specimen from low-lying Jiménez was almost surely taken on neighboring Turrialba Volcano. It occurs commonly on the Caribbean versant of the central highlands and in the Dota region. Locally and in smaller numbers it is present on the Pacific side of the Talamanca Cordillera, probably also on its Caribbean side, where it has not yet been recorded. In addition, I found it occasionally at two localities on the Cordillera de Tilarán; it is not known to reach the Guanacaste Cordillera. In general, it is met irregularly in some places, several times daily in others.

This delicately formed furnariid is an ar-

boreal species that frequents edges, cuts, and scattered trees in small openings amid luxuriant cloud forest. It keeps low in the trees and high in the thickety undergrowth, seldom dropping to eye level. For the most part it travels about singly or in separated two's or three's with noisy mixed bands of busily foraging warblers (*Basileuterus*), tanagers (*Tangara*), other arboreal furnariids, the antwren *Myrmotherula schisticolor*, the antshrike *Thamnistes*, the barbet *Eubucco*, a sprinkling of woodhewers, and others. Actively creeping, climbing, clinging, and rummaging, the bird investigates thickets, vines, trunks, and epiphytes.

Its rasping dry call, typically that of an arboreal ovenbird, resembles that of *Thripadectes* and *Syndactyla*. It differs in its two-part downscale pattern and in quality, but it has a similar succession of "k" consonants. Sounding like a throat-constricted "ukukuk·ikik·ikikik," it changes midway from a scratchy descending series of "uk" 's into a weaker series of level "ik" 's (or "eek" 's). A reedy, three-syllable call is also given.

***Margarornis rubiginosus* Lawrence**

RUDDY TREERUNNER

RANGE: Costa Rica and western Panama.

Margarornis rubiginosus rubiginosus

Lawrence

RANGE: Costa Rica and adjacent western Panama.

This brightly plumaged dendrocolaptid-like little furnariid lives at high altitudes, mostly on the Caribbean versant of the volcanic central highlands, also in the Aguacate Mountains, the Dota Mountains, and along the Talamanca Cordillera; it has not been reported from the northwestern divide. From timber line it ranges downward through the lower montane belt in steadily diminishing numbers. A few records from the subtropical belt probably apply to individuals that descended cloud-forested pockets to the lower limits of the belt. At its center of abundance in the montane belt only one other ovenbird, the considerably larger *Pseudocolaptes*, is present. Both *Margarornis* and *Pseudocolaptes* resemble and act like woodhewers, of which there is only one (*Lepidocolaptes affinis*) at the very high elevations.

The bird frequents thickety, overgrown edges, clearings with trees, and woodland. It hitches itself lightly up the trunks in the manner of a little woodhewer but with the erratic side-to-side spurts of a trunk-climbing wren. The pointed soft tail provides little support in climbing, yet sometimes serves as a stationary prop. The bird also creeps along branches and clings to thickety, bamboo-like growth. Rarely, it drops to the ground. It either accompanies traveling mixed bands or forages alone. Constantly searching for food, the bird shows a special interest in the moss clinging and hanging everywhere. In common with many native ovenbirds and woodhewers, it occurs singly or sometimes in two's.

Vocally the bird is undistinguished. Its call is a thinly whistled "tsitting" delivered rapidly in jumbled sets or as a patterned sibilant "tsnt-tsnt tsnt-tsnt," and so on, that could just as well be attributed to neighboring tanagers, warblers, and finches. The bird also makes weak but sharp metallic chirps and a trill.

Premnoplex brunescens (Sclater)

SPOTTED BARBTAIL

RANGE: Costa Rica to Bolivia and Venezuela.

Premnoplex brunescens brunneicauda
(Lawrence)

RANGE: Costa Rica and western Panama.

The little Spotted Barbtail is common in the central highlands, especially upon the Caribbean versant, and in the Dota Mountains. It has been found locally along the Pacific side of the Talamanca Cordillera, not as yet on the Caribbean side. It follows the Cordillera de Tilarán northwestward but stops, so far as known, short of the Guana-caste Cordillera. The bird is most common in the subtropical belt, particularly its upper portion, and ranges in good numbers upward into the lower montane belt and possibly higher.

This inconspicuous furnariid is at home in the dark dank understory of the cool and misty highland forests. Occasionally it visits an opening with densely foliated trees and stumps covered with moss and epiphytes. It climbs trunks and creeps along limbs, sometimes on their under sides, like a spurting lit-

tle woodhewer and clings to twigs like a xenops. Nervously active, it explores the vegetation rising from the ground cover up to medium heights in the trees. Generally it occurs alone. When in two's, the separated members are each animatedly aware of the other's presence.

Its squeaky toylike note is a variable sort of "tsip." More easily remembered is the call, a descending series of weakening "tsip" 's, similar to that of the flycatcher *Todirostrum nigriceps*, but somewhat differently paced and patterned.

Pseudocolaptes lawrencii Ridgway

LAWRENCE'S TUFTED-CHEEK

RANGE: Costa Rica to western Ecuador.

Pseudocolaptes lawrencii lawrencii Ridgway

RANGE: Costa Rica and adjacent western Panama.

The center of abundance of this species is in the upper portion of the montane belt in the central highlands, including the high mountains in the Dota region. On the high Talamanca Cordillera, along which it probably occurs sparsely but more or less continuously, it is known from but two well-separated sites. Personally, I found the bird common only at the base of the crater on Turrialba Volcano. Its numbers diminish rapidly with decreasing elevation, and the bird is quite uncommon if not rare in the lower montane belt. Although it has been recorded from the upper limit of the subtropical belt, I suspect the actual collecting sites were higher in the mountains.

I do not recall seeing this species well inside forest but at the borders of woodland and frequenting the trees, each a miniature forest, in the parklike pastures. If it is indeed a non-forest species, as its relative abundance on the partially deforested volcanoes suggests, then the lack of reports from the formerly solidly forested Talamanca Cordillera becomes understandable. I never saw it there despite a number of visits, but the bird will probably be reported increasingly as the forests are cleared.

Pseudocolaptes "is a very noisy bird, always chattering and continually moving about in the trees. It is usually seen in pairs" (Carriker, 1910, p. 638). It creeps along the

under sides of limbs like a woodhewer, and it specializes in rummaging the masses of epiphytes that help give the montane cloud forests their fantastic appearance.

***Hyloctistes subulatus* (Spix)**

STRIPED FOLIAGE-GLEANER

RANGE: Nicaragua to Peru and northern and western Brazil.

***Hyloctistes subulatus virgatus* (Lawrence)**

RANGE: Costa Rica and western Panama.

The distribution of this ovenbird virtually follows the humid-forested tropical belt on both slopes, thus excluding the Pacific lowlands and the continental divide in the northwest. Though everywhere encountered irregularly, the bird is less uncommon in the Térraba-Golfo Dulce region than along the Caribbean slope. A forest species, it occasionally visits shade trees in the semi-open next to the forest border.

It acts much like the far more abundant and widely distributed *Automolus ochrolaemus*. Both are "foliage-gleaners," that is, they creep and hop about in the foliage, cling to leafy branches and twigs, and habitually rummage viny tangles, air plants, and accumulations of trash both hanging and lodged. The sturdy *Automolus* frequents the denser parts of the understory. The less robust *Hyloctistes* occurs from the upper understory to medium heights in the trees.

The bird is met singly, sometimes in two's, usually in the company of antwrens and antvireos circulating immediately above the forest understory. As it is hard to see well, its status can best be estimated by the frequency with which one hears its cry, a sharp arresting "squirk." It also gives two sorts of calls. One consists of an iterated, rough but resonant note: "kur-kur-kur-kur," and so on. The other is a measured series of strong nasal "chip" 's.

***Syndactyla subalaris* (Sclater)**

LINEATED FOLIAGE-GLEANER

RANGE: Costa Rica to Peru and Venezuela.

***Syndactyla subalaris lineata* (Lawrence)**

RANGE: Costa Rica and western Panama.

This species is primarily an inhabitant of the middle altitudes along the Caribbean

versant of the central highlands. It is present in small numbers in the Dota region and along the Pacific side of the Talamanca Cordillera (and probably on its Caribbean side). I have a single observation for the continental divide south of Lake Arenal; possibly its range continues to the Guanacaste Cordillera. The bird is met most frequently in the cool and wet subtropical belt, below which it hardly descends but above which it rises in lessening numbers to the upper portion of the lower montane belt. It often occurs in the same places with other subtropical-belt furnariids (*Thripadectes*, *Anabacerthia*, *Premnoplex*, and *Cranioleuca*), all indicator species of the wet-forested highlands. It is encountered irregularly, singly and in two's, even in the favored portions of its range.

Normally of sedentary habit, this foliage-gleaner is usually found low along the periphery of or at breaks in the forest, mostly in the dense growth rising from the almost impenetrable ground cover, rather than inside the forest. It forages in the undergrowth and, perhaps to a greater extent, low in the trees, rarely to medium heights from the ground. Sometimes it travels about in the mixed company of other birds. Its habitat niche is somewhat intermediate between that of the undergrowth-inhabiting *Thripadectes* and the xenops-like, strictly arboreal *Anabacerthia*. In common with other species living in heavy shade, it often keeps its contrasting, light-colored throat brightly puffed.

Vocally it is very close to *Thripadectes*, similar to *Cranioleuca*, and more distant from *Anabacerthia*. Its arresting call is a desiccated "ki-ki-kikikikiki-ki," given either on a level or somewhat up and then down the scale, slightly speeded in the middle. It is the sort of sound produced not from a living throat but by a dry mechanism. It is perhaps higher pitched than the similar call of *Thripadectes*; at any rate, the vowel quality is closer to "i" than "ë." A dry, nasal or reedy "tcheck" or "tsuck" is hardly different from the "tseck" of *Thripadectes*.

***Anabacerthia striaticollis* Lafresnaye**

SCALY-THROATED FOLIAGE-GLEANER

RANGE: Southern Mexico to Bolivia and Venezuela.

Anabacerthia striaticollis variegaticeps
(Sclater)

RANGE: Southern Mexico to western Panama.

The distribution of this species in the cool and wet middle altitudes seems to be identical to that of *Syndactyla subalaris*: the Caribbean side of the central highlands, the Dota Mountains, and the Talamanca Cordillera (though not yet recorded from its Caribbean side). Its center of abundance follows the upper portion of the subtropical belt, from which the bird ranges higher into the lower montane belt, sometimes penetrating the montane belt, and a little lower in the subtropical belt.

Generally a component of a mixed insect-eating bird party sweeping noisily through the trees, this strictly arboreal foliage-gleaner forages usually singly and in two's, sometimes in three's or four's, in the middle and upper forest strata and along the forest border. Though an active bird, it moves about in the same tree considerably longer than the restless warblers and tanagers which it accompanies. It flits in the foliage, clings upside down to fronds, hops along branches, and makes acrobatic, side-slipping flutters in pursuit of dislodged prey. As might be expected from its wedge-shaped beak and slightly hammerheaded look, it also pecks rotten twigs. Constantly searching and probing, it turns its body from side to side while flicking its wings and squeaking. With its tail spread or held downward and forward at an angle with the body, the bird looks animated even when at rest. In general appearance and behavior it is a magnified, longer-tailed counterpart of *Xenops*. As either or both may accompany the same mixed band, the size difference between *Anabacerthia* and *Xenops* could permit a non-clashing exploitation of similar niches.

I have no comparative notes on its voice, which is the typically dry one of a foliage-gleaner. The call is a peculiar scratchy rattle, sort of scraping or whetting. The call note is a lisping sharp squeak.

Philydor rufus (Vieillot)

OCHRACEOUS FOLIAGE-GLEANER

RANGE: Costa Rica to Bolivia and extreme northeastern Argentina.

Philydor rufus panerythrus Sclater

RANGE: Costa Rica and western Panama; west slope of eastern Andes in Colombia.

The Ochraceous Foliage-gleaner has the same geographical and ecological distribution as the preceding ones, except that it has not yet been recorded from the main Talamanca Range. So far as known, therefore, this seldom-seen species inhabits the cool and wet middle altitudes, mostly the Caribbean slopes of the central highlands, also the Dota region. Also, I have a single observation for the northwestern divide south of Lake Arenal. It ranges vertically from the upper half of the subtropical belt, or lower in cloud-forested pockets, to the upper limit of the lower montane belt.

This ovenbird is strictly arboreal, usually keeping well above the ground in forest, along its borders, or at breaks in the mountainous terrain. I have seen it, as a rule, singly, the only one of its kind in a traveling mixed flock; I have one observation of an individual foraging alone. An active bird, it searches limbs energetically while sweeping its tail and twisting its body. Occasionally I heard it make single-note cries of which I have no recollection other than that they sounded ovenbird-like. Though my encounters with this species were few, I believe the above outline will not be altered much by future observations.

Automolus ochrolaemus (Tschudi)

BUFF-THROATED AUTOMOLUS

RANGE: Southern Mexico to Bolivia and central Brazil.

Automolus ochrolaemus hypophaeus Ridgway

RANGE: Eastern Nicaragua to northwestern Panama.

Automolus ochrolaemus exsertus Bangs

RANGE: Southwestern Costa Rica and adjacent western Panama.

The species ranges widely from sea level up to at least 4000 feet on both slopes; it is absent from the Tropical Dry Forest. The Caribbean *hypophaeus*, which is most abundant in the tropical belt, rises well into the

subtropical belt except in the northwest, where it barely laps over the continental divide. There I found it only at the gap between the Cordilleras de Guanacaste and de Tilarán. The southwestern *exsertus* is common up to 3000 feet and occasional, or local, at higher elevations.

The automolus is a woodland bird that inhabits shaded, wildly tangled undergrowth and low leafy branches in the understory, also thickety second growth connected to forest; I have not seen it actually on the ground. It seldom ventures into trees outside woodland or into low cover away from a neighboring overgrown ravine. The bird creeps along branches, clings to clusters of dead leaves, rummages noisily in bromeliads and accumulations of trash, and climbs trunks covered with viny growth. It can spurt along a branch or sturdy stem, and at times it creeps head downward. As seen in typical pose, with its body inclined downward and its head lower than its tail, the brightly alert bird exhibits a high-strung twitching as though it were on the verge of dashing off. Its crown feathers may be raised and its contrasting light throat conspicuously puffed.

Sometimes the automolus occurs in straggling, small parties that may or may not be associated with other birds. A party is likely to reappear at the same spot on successive days, or it may move about unpredictably. More often the bird is seen singly or in separated two's, when it seems to be sedentary for the most part. One individual may be heard calling from a ravine day after day at the same time in the morning. Another may be flushed repeatedly from the same patch of undergrowth. Apparently a group, perhaps a family party, will troop about boldly where the species occurs in abundance. Single birds, not necessarily nesting ones, are shyer, quieter, and act as though resident in a particular site.

The bird utters several sounds, two of them distinctive. One is a snorting churr or nasal roll difficult to describe; it is less striking in *exsertus* than in *hypophaeus*. The other is a low, harsh, "crecking" churr resembling the froglike call of a distant Keel-billed Toucan (*Ramphastos sulfuratus*). The bird also has several call notes.

***Thripadectes rufobrunneus* (Lawrence)**

STREAKED-BREASTED FOLIAGE-GLEANER

RANGE: Costa Rica and western Panama.

This sturdy furnariid is most common on the Caribbean slope of the central highlands. It also occurs on the Pacific slope in the mountains that border the central plateau, the Dota Mountains, and the Talamanca Cordillera (one record, Ujarrás de Térraba). It is not known from the northwestern divide. The center of abundance is at 2500–4000 feet in wooded country in the cool, subtropical belt, from which the bird ranges upward into the lower montane belt.

Where uncommon and rarely seen, it keeps concealed low in dense undergrowth that comprises ferns, bamboo-like thickets, shrubbery, and brush; here it rummages noisily in low-hanging trash and clusters of dead leaves. Where it is more common its behavior is varied and its temperament bolder. The bird is apt to expose itself and, acting more as an arboreal ovenbird should, it hops along branches and examines epiphytes, climbs vines, and clings or hangs like *Xenops* or *Anabacerthia*. Sometimes it flutters or hovers momentarily in contrast to other species of ransacking habit. It may even fly to brush in a clearing.

The bird is generally encountered singly, also in two's and three's that may call back and forth and climb about low in the same tree. Usually its tail is bent forward as in many arboreal furnariids, but it can also be rapidly flicked backward and upward in an arc reaching the nape. I have not seen this odd mannerism carried to such an extreme in any other bird nor am I aware of its significance.

The call is a very dry and scratchy, woodpecker-like, level rattle that consists of accelerating "ek" 's (or "teck" 's or "tseck" 's). It often sounds wooden. The bird also gives a single "teck" or "tseck," sometimes like that of the tanager *Ramphocelus passerinii*, sometimes as sharp as that of a leafscraper (*Sclerurus guatemalensis*); a double, scratchy and dry "ek·ek" or "rek rek"; and a reedy chucking, sharp yet loosely rattling as in the woodpecker *Phloeocastes*. The call and call notes are often distinguishable from those of *Syndactyla subalaris* only on direct comparison.

Xenops rutilans Temminck

STREAKED XENOPS

RANGE: Costa Rica to Bolivia and northern Argentina.

Xenops rutilans septentrionalis Zimmer

RANGE: Costa Rica and western Panama.

The Streaked Xenops is a subtropical species heretofore known mostly from a handful of localities grouped along the Caribbean slope of the central highlands. I found it also above Potrero Grande and at Cañas Gordas on the Pacific slope of the Talamanca Cordillera; the species is almost surely present, too, along its Caribbean slope. There is no record from the northwestern cordilleras. An altitudinal replacement of the congeneric *minutus*, it is quite absent, except as a possible wanderer, from the tropical belt, where *minutus* is most abundant. Restricted to tall humid forest and its borders, it is locally not uncommon yet rare in the country as a whole. The common *minutus* has a much wider geographical and ecological range. Even in the broad zone of overlap in the subtropical belt it is often outnumbered by *minutus*. The two species are virtually identical in size, proportions, and general habits.

An active little bird, the Streaked Xenops works its way through the forest trees, either singly or in two's, in the company of mixed arboreal bird parties. Its foraging behavior thus matches that of *minutus* when the latter is in forest. In fact, both species may be found in the same mixed band. The call of the Streaked is a metallic "zs·zs·zs·zs·zs," not a rattle, given on a level.

Xenops minutus (Sparrman)

PLAIN XENOPS

RANGE: Southern Mexico to Bolivia and extreme northeastern Argentina.

Xenops minutus ridgwayi

Hartert and Goodson

RANGE: Nicaragua to western Panama.

The Plain Xenops inhabits both slopes from sea level well into the subtropical belt. It is common in the humid life zones, sparse in the subhumid Pacific northwest, and rare or accidental on the central plateau. Properly an arboreal inhabitant of forest and maturing second growth, it shows up regularly in par-

tially shaded plantations, sometimes down to eye level, and it even strays into tree-scattered clearings. At least two individuals are usually found together, fairly low in small or medium-sized trees in the semi-open or in the upper understory in forest, but also very high in the trees in either set of surroundings. In the forest it usually accompanies traveling mixed bands.

The bird explores branches and twigs along which it habitually moves sideways like a clinging tit, hangs from curled dry leaves like an antwren or greenlet, and often, like a piculet, loudly pecks woody branchlets and dead leaf clusters. In the forest it is apt to occur together with the little Wedge-billed Woodhewer, *Glyphorynchus spirurus*, which also pecks, but the latter is a relatively sedentary, stiff-tailed bird that creeps on trunks. Occasionally, in the presence of another bird or two of its own kind, the Plain Xenops, with its tail spread as though to display the attractive pattern, performs a rotational creep around a twig.

Its chipping note, sometimes given as persistently as by a disturbed warbler, may be doubled or run into a quick trill, either rattling or somewhat musical. This trill, slowing at the end, haltingly, for the last two or three notes, is otherwise similar to that of the manakin *Pipra coronata*. The bird also utters a high thin "tsiss" or "tsnn" and a continual, sort of whistled "ss," like that of a baby bird.

Sclerurus albigularis Sclater and Salvin

GRAY-THROATED LEAFSCRAPER

RANGE: Costa Rica to Bolivia and Venezuela.

Sclerurus albigularis canigularis Ridgway

RANGE: Costa Rica and adjacent western Panama.

The Gray-throated Leafscraper, if not actually rare, is certainly seldom encountered. Known only from the northern half of the country, its recorded localities are restricted to the subtropical belt along the Caribbean slope of the Cordillera Central and the Pacific face of the Guanacaste Cordillera. The species is undoubtedly present along both slopes of the Cordillera de Tilarán as well as the Caribbean side of the Guanacaste

Cordillera. Almost surely it occurs, too, along the Talamanca Cordillera, at least on the Caribbean side, southward to Panama. The only notes I heard were light squeaky "squip" 's, indistinguishable from those of many other kinds of birds.

This and the two other Costa Rican leafscrapers are so much alike in appearance, habits, and choice of habitat that the following remarks apply to the genus. Almost entirely terrestrial, they prefer relatively uncluttered portions of the damp and muddy floor in very humid forest, from which they occasionally enter contiguous tall second growth. They are normally quite solitary, though sometimes seen in separated two's, and appear to be resident wherever found. Dull dark brown in color, they are difficult to distinguish in the darkness of the understory. Their stiff posture is robin-like (*Turdus*), but the birds are so short-legged that their bellies rest almost on the ground. The tail, continuing the long axis of the body, touches the ground at its tip and seems to function as a prop.

The birds rummage and scratch in the debris that covers the ground and habitually flick aside with their beaks the muddy, moldy, disintegrating leaves for several inches. They also probe the soil, and their beaks are often covered with mud. Sometimes the birds rise to a low branch or stem to which they cling in typical ovenbird manner, that is, with the tail bent obtusely under the body. Or they may mount a rotting log in order to probe the mucky pockets of decay. They progress awkwardly in short two-legged leaps at least as high as long. Sometimes they run flutteringly along the ground. When unduly disturbed, they dash off in curving low flight, usually for a short distance, and re-align upon the ground, in the manner of a waterthrush (*Seiurus*). Normally they are not particularly wary of the observer. On rare occasions I have seen a bird (*guatemalensis*) dash crazily to the lower part of a trunk or to a buttress, flutter at or cling to it for a few moments, then just as erratically dash away.

Their often-repeated, sharp squeaks and their nervous mannerisms invite attention; otherwise the birds would probably remain unnoticed. Invariably accompanying the

squeaks, but also exhibited at other times, are lightning wing flicks coupled or not with an instantaneous about-face, a small jerk of the body, and rapid short downward jerkings of the tail.

Distributionally, the common *guatemalensis* occurs mostly in the tropical belt; the very uncommon *albigularis* and *mexicanus* occur in the subtropical belt. According to present information, *guatemalensis* and *albigularis* have a slight vertical overlap in the lower subtropical belt along the eastern edge of the Cordillera Central and the Pacific face of the Guanacaste Cordillera. *Mexicanus*, so far as known, is absent from the Guanacaste Cordillera but present on the Cordillera de Tilarán, along which *albigularis* has not been found. *Mexicanus* also occurs in the southwest, where *albigularis* is not recorded. *Guatemalensis* and *mexicanus* have been found in the same districts but not precisely at the same site. The fact of their very similar sharp call notes would appear to lend support to their apparent ecological allopatry. On the other hand, *guatemalensis* and *albigularis*, definitely known to occur together at the same site, have recognizably different call notes.

Sclerurus mexicanus Slater

TAWNY-THROATED LEAFSCRAPER

RANGE: Southern Mexico to Bolivia and eastern Brazil.

Sclerurus mexicanus pullus Bangs

RANGE: Costa Rica and western Panama.

This leafscraper, known previously only from two localities (Carrillo and Cariblanco) on the Caribbean, northern slope of the Cordillera Central, I found in similar cool and wet environments in the subtropical belt along the Cordillera de Tilarán (Monteverde and El Silencio), a ridge that overlooks the Reventazón Valley southeast from Turrialba Volcano (Matrículas de Pavones), and the Pacific slope of the Talamanca Cordillera (Cerro Chirripó). The species is probably distributed sparingly along both slopes from the northern end of the Guanacaste Cordillera near Nicaragua southward along the mountainous backbone of the country into Panama.

Though it is seldom encountered, I suspect

its true status to be uncommon rather than rare. So far as known, it is at least partially sympatric with *albigularis*. It seems not to differ in habits and habitat from the latter or from the largely allopatric *guatemalensis* (see below). Its call is a series of consecutively descending sharp "squee" 's. Its call note is not quite so sharp to my ear as that of *guatemalensis*.

***Sclerurus guatemalensis* (Hartlaub)**

SCALY-THROATED LEAFSCRAPER

RANGE: Southern Mexico to western Ecuador.

***Sclerurus guatemalensis guatemalensis*
(Hartlaub)**

RANGE: Southern Mexico to Panama.

The Scaly-throated, the common leaf-scraper of Costa Rica, is nearly restricted to tropical-belt humid forest along both slopes (thus excluding the northwestern Pacific lowlands). It does rise to the lower limits of the subtropical belt on the Caribbean side, including overlap of the Pacific face of the northwestern divide, but it apparently does not occur above the tropical belt in the Pacific southwest. Vertically its range reaches, in places, the lower limit of that of *albigularis* and *mexicanus*. The species is relatively abundant compared with the latter, rarely encountered birds. Its self-identifying call note is an unusually sharp squeak. Given occasionally is a series of "squick" 's. Its arresting "song" is a patterned "pwik wik·wik·wik·wik·wik·wik" that rises and speeds in the middle, then slows somewhat.

FAMILY FORMICARIIDAE

***Cymbilaimus lineatus* (Leach)**

FASCIATED ANTSHRIKE

RANGE: Extreme southeastern Honduras to Bolivia and Brazil.

***Cymbilaimus lineatus fasciatus* (Ridgway)**

RANGE: Extreme southeastern Honduras to northwestern Ecuador.

A Caribbean species nearly restricted to the tropical belt, this antshrike rises into the lower subtropical belt, so far as known, only upon the slopes of the Cordillera Central; apparently it does not overlap the northwestern

divide. It is arboreal in lowland "jungle," that is, wildly tangled intermediate second growth composed of thickets, shrubbery, and small trees, at forest borders, roadsides, streamsides, boundaries, abandoned plantations, and other regenerating areas. Sometimes it enters a densely foliated small tree in a tended plantation, and I have met it occasionally in a vegetation-choked gully. It usually keeps several yards above the ground, almost always in loosely associated pairs. The bird is sedentary, sluggish, and deliberate in its actions, moving among the leafy branches with heavy-bodied hops and short leaps. It shows curiosity and can be approached closely.

Both sexes have a variety of vocalizations which they give frequently. The usual call is unlike that of other Costa Rican antshrikes, except an infrequent one of *Thamnophilus doliatus*. It consists of four or more upwardly inflected, almost cooing "woo·oop" 's or "ooah" 's, accented on either syllable, delivered in slightly descending order. It sounds distant even when the bird is near. Other calls include a querulous "chyowww" fading from the accented "chy," a *Gymnopithys*-like whine, a hard staggering rattle, and a rapid-fire rattle mixed with soft notes.

***Taraba major* (Vieillot)**

GREAT ANTSHRIKE

RANGE: Southern Mexico to Bolivia and northern Argentina.

***Taraba major melanocrissus* (Sclater)**

RANGE: Southern Mexico to northwestern Panama.

***Taraba major obscurus* Zimmer**

RANGE: Pacific Costa Rica to Colombia.

This large and heavy antshrike inhabits primarily the humid lowlands on both slopes. The Caribbean *melanocrissus* ranges sparingly, or locally, to about 3000 feet in the foothills east of the central plateau; it is uncommon or local along the northwestern divide, where I found it only at Lake Arenal. The Pacific race, *obscurus*, occurs in the southwest, most commonly in the Térraba-Golfo Dulce sector; it has been recorded

northward to the lowlands around the Gulf of Nicoya. The males of the two races are, for the most part, intermediate in appearance in Costa Rica, although the Caribbean birds do tend to blacker under tail coverts. The females are more distinct, those of *obscurus* approaching cinnamon-rufous in dorsal coloration, whereas those of *melanocrissus* are browner, or more chestnut.

A nonforest species, this antshrike dwells in thick new growth, including thickets and shrubbery, impenetrable edges, brushy margins, and high tangled grass along ditches, streams, and embankments. It is abundant in the wild undergrowth of abandoned banana lands, where I have seen it noisily pulling banana fronds apart. Occasionally it rises from concealment to the upper branches of an emergent small tree. It even enters low trees in cacao plantations where there is no ground cover. Its neighbors include, among birds hidden with it, *Synallaxis brachyura*, *Thryothorus modestus*, *Cercomacra tyrannina*, *Laterallus albigularis*, and others; among birds moving above or around it, *Arremonops conirostris*, *Ramphocelus passerinii*, seedeaters, and grassquits. Sometimes it is seen with the ant-attending *Gymnocichla nudiceps*.

The bird occurs, as a rule, in pairs. Should one fluttering, tail-twisting individual fly across a small opening, its companion of the other sex is almost sure to follow. The bird responds to squeaking, as do other though not all thicket-inhabiting birds, by mounting higher in a tangle to reveal its liquid "bloody" eye and disturbedly inquiring crest. Wherever it occurs, this species makes its hidden presence known by its unmistakable, sometimes monotonously repeated call: a slightly descending, bouncing roll that weakens as it accelerates. It ends simply by stopping before it would, if continued, peter out; occasionally it does peter out. If it had an emphatic final note it would fit the pattern of the three species of *Thamnophilus*. As it is, it could be mistaken for the call of a trogon, such as *Trogon massena* and *T. melanocephalus*. The bird also utters a throaty rolling "churr," slower and shorter than that of the spinetail *Synallaxis brachyura*, a typical whine of an antbird, a "tsurr" that sounds like a saw blade at work, and an odd, deep, and sort of bubbly "choor."

***Thamnophilus doliatus* (Linnaeus)**

BARRED ANTSHRIKE

RANGE: Eastern Mexico to Bolivia and extreme northeastern Argentina.

Thamnophilus doliatus intermedius

Ridgway

RANGE: Eastern Mexico to southeastern Costa Rica (and probably adjacent Panama).

***Thamnophilus doliatus pacificus* Ridgway**

RANGE: El Salvador to southwestern Panama.

The Barred Antshrike has a spotty distribution along both slopes. It is most abundant in the tropical belt on the Pacific side, both in the dry-forested and moist-forested life zones, and ranges eastward and upward to the central plateau; it is uncommon above the lowlands at the northwestern divide. On the Caribbean side it is found mostly in the lower subtropical and upper tropical belts that front the Cordillera Central, but also much lower in the open Río Frío region; it is rare or at best uncommon locally in the forested lowlands. The two forms meet and are indeterminable racially on the central plateau. Specimens from the Pacific lowlands are variable. The majority tend toward *pacificus*, yet other individuals taken at the same localities approach *intermedius*. Also, a number of specimens from the humid southwest I find indistinguishable from the Caribbean *intermedius*.

The species usually keeps within 10 feet of the ground in unshaded dense low growth, such as shrubbery, thickets, and tangled forest borders; it hardly penetrates woodland if at all. Though not really shy, this antshrike is hard to see in its habitat. It may show itself at close range in a gap in the shrubbery; sometimes it moves about openly on the branches of low trees. Typically it occurs in pairs, both members of which have the crest raised, perhaps as a response to their mate or to the observer. The bird progresses heavily by means of short, wing-assisted leaps that agitate the foliage. Animalivorous like most of its family, it sometimes attends army ants in the company of *Gymnocichla*.

The Barred Antshrike is heard far more often than seen. Its most common call is a

fowl-like cackle or roll that descends and accelerates until finished by an upwardly accented, lengthened last note. Without this terminating flourish the roll could be that of *Taraba*. On the Caribbean side the descending roll distinguishes it from the level call of the congeneric *punctatus*. On the Pacific side, both the descending roll and the final accent separate it from that of *bridgesi*. Less frequently the bird utters a call of four or five dovelike or trogon-like "pyoo"'s not unlike those of *Cymbilaimus*, as well as a tough or emphatic "gnaar," accompanied by a raising of the crest and, trogon-like, a quick lifting and slow lowering of the tail. Both sexes seem to call equally well.

***Thamnophilus bridgesi* Sclater**

BRIDGES' ANTSHRIKE

RANGE: Pacific slope, Costa Rica and western Panama.

Bridges' Antshrike is confined to the Pacific slope. Most numerous in the humid tropical belt, it is abundant in the Térraba-Golfo Dulce sector, where it is still locally common at 3500 feet or more. It decreases in numbers toward the dry-forested northwest and is rare at the head of the Gulf of Nicoya, its northern limit in the lowlands. It becomes common again at lower subtropical elevations along the humid continental divide in the vicinity of Lake Arenal and Tenorio Volcano, where its known range terminates abruptly.

The bird lives in thickets and dense scrubby growth in the open and at the borders of woodland, as does the congeneric *doliatus*, but sometimes it rises 40 feet or more in the trees, which *doliatus* does not. Perhaps more commonly, or at least in greater numbers locally, it inhabits undergrowth and low trees inside forest, where *doliatus* is not found. It also occurs to some extent in mangroves, one of the few antbirds to enter this habitat. It is nearly always seen in pairs, many of which dot a favorable area. The bird shows curiosity, is not shy, and may expose itself boldly at close range, as in forest where the understory is not particularly dense, but usually the nature of the habitat makes it a hard bird to see; it responds immediately to squeaking. A sluggish bird of heavy-bodied movement, it is easy to find

again when frightened into flight simply by one's following its course through the disturbed foliage.

The bird utters several different sounds. The regular call is similar to that of *doliatus*, but all the notes, including the lengthened and strengthened final one, are on the same level. Also given commonly are a rolling cackle almost exactly like that of a robin (*Turdus*), but higher-pitched, a trogon-like chuckle, a rattle, a reedy call, a sort of nasal, measured "laugh," and others. Its tail vibrates to the rhythm of the rolls and rattles.

***Thamnophilus punctatus* (Shaw)**

SLATY ANTSHRIKE

RANGE: British Honduras to Bolivia and southeastern Brazil.

Thamnophilus punctatus atrinucha

Salvin and Godman

RANGE: British Honduras to northwestern Ecuador.

The Slaty Antshrike, a Caribbean species, is found primarily in the tropical belt, irregularly above its upper limits, rarely over 3000 feet. At the higher elevations, as noted by Carriker (1910, p. 603), it has probably followed the larger river valleys inland. Common throughout the lowlands, it is extraordinarily abundant in the extreme southeast where, in addition to its preferred habitat, it occupies the matted scrub favored elsewhere by the nearly absent *doliatus*. As a rule, it frequents small trees and thickets in the upper understory in woodland, seldom rising 30 feet up. Sometimes it forages in a semi-isolated low tree in a neighboring cacao plantation.

This sedentary antshrike does not appear to leave a circumscribed area in which it can be rediscovered daily. It is almost always found in pairs. The freely used voice evidently serves as a pair bond; when one bird is discovered, its mate predictably reveals itself by calling. In general these stout little birds are remarkably fearless and leave concealment when their curiosity is aroused. Betraying their presence they forage in a clumsy deliberate manner, hopping heavily or fluttering from one bending twig or quaking cluster of leaves to another. Sometimes they sit sluggishly, like a trogon or becard,

completely exposed to view. The normally concealed white patch of the male in the upper part of his back becomes functional during sexual excitement, when it is fluffed into a conspicuous white hump and displayed.

The species possesses two formal calls or "songs." One is a characteristic "ah—ddddddip," consisting of an introductory note followed by a very rapid series of "d's" running consecutively upscale or, exactly reversed, downscale (when it sounds more like "drrrrrr"); the "ah" (or "ank" or "wonk") may be placed at either or both ends. The other call is almost exactly like the roll of *doliatus*, but bounces along a level plane before arriving at the accented final note. The bird makes at least seven other kinds of sounds.

Thamnistes anabatinus Sclater and Salvin

RUSSET ANTSHRIKE

RANGE: Southeastern Mexico to western Venezuela and Bolivia.

Thamnistes anabatinus saturatus Ridgway

RANGE: Nicaragua to western Panama.

The species is known from two faunal zones: the northern half or two-thirds of the Caribbean slope and the Pacific southwest. It is fairly common and well dispersed on the Caribbean side (except the southeast) in the tropical and subtropical belts and overlaps the subtropical Pacific face of the northwestern divide. In the southwest it occurs sparingly from the entrance to the Gulf of Nicoya southward to the Térraba region, but becomes abundant, perhaps only locally, in the forested lowlands that border the Golfo Dulce. It rises to at least 4500 feet at the Panamanian border.

An arboreal inhabitant of humid forest, this antshrike also occurs in tall second growth and immediately adjoining semi-open terrain. It is met singly, in separated two's, or as several loosely associated individuals from fairly low to very high in the trees; unusually it drops to the ground. It often travels with mixed bird parties high in closed forest or considerably lower at openings in the forest; outside the forest it usually forages at or below medium heights. On the Osa Peninsula I found it regularly in small

groups associated with the tanager *Lanio*.

Searching, probing, and bending from branches and foliage like a wren, antwren, and tanager, the actions of this bird bring to mind a hypothetically large, slow-moving *Myrmotherula*; its chestnut tail contrasting in color with its body, an arboreal ovenbird. Its voice, its occurrence high in the trees, its traveling about, its association with mixed bands, its active behavior, the similarity of the sexes, all suggest that it may not be an "antshrike."

The "song" is a measured series of "tswit" 's, intensifying and then falling. The common cries are a "switsit" or "tsweésit," often indistinguishable from the similar note of the euphonia *Tanagra minuta*, and a measured piercing "weesawisst" like that of some small bird. A sharp "peest" may be uttered singly or inserted in the "song." Also given is a minor "tsüür."

Dysithamnus mentalis (Temminck)

PLAIN ANTVIREO

RANGE: Southeastern Mexico to Bolivia and extreme northern Argentina.

Dysithamnus mentalis septentrionalis
Ridgway

RANGE: Southeastern Mexico to western Panama.

The Plain Antvireo, centered numerically between 3000 and 4000 feet, is virtually confined to the wet subtropical belt along both slopes; it barely rises into the lower limits of the lower montane belt. It is very common along the Caribbean versant of the central highlands and, locally, the Pacific slope of the Talamanca Cordillera in the southwest. It undoubtedly occurs on the Caribbean slope of the cordillera despite the lack of records. It is known from both faces of the northwestern divide and the mountainous country south from the central plateau, but not on the plateau itself. In addition, I have an observation of a lone individual accompanying a traveling mixed band in the Sarapiquí lowlands. The species is found exclusively in cool, very humid forest in which it inhabits the understory from as low as a foot to a few yards above the forest floor; occasionally it rises some 40 feet in the trees. It shows no

preference for tangled cover and seldom goes to the ground. It is seen singly and in pairs, sometimes in three's, rarely in larger groups.

This antvireo, despite its rather solitary nature and its sunless surroundings suited for concealment, is, so to speak, a friendly confiding little bird that shows curiosity. Its actions, while not sluggish, are deliberate. Having appraised the food-providing possibilities of its immediate environment, the bird forages in jerky hops or fluttering movements. On occasion it flits or dashes, yet it does not dissolve from view as do little forest flycatchers and manakins; nor, unlike those birds, does it remain figuratively tied to a perch. Normally this antvireo is sedentary; at any rate, it does not seem to roam far. It carries on its daily activities unostentatiously while noisy bands of energetic antwrens, forest vireos, warblers, tanagers, and others pass over or through the site.

The species utters a larger variety of sounds than its congeners. One of its calls is a soft "choo-toó" or "woo-toó" similar to the two-note whistles of the other two species, except that the latter have the first note higher than the second. It may be repeated variably a few times as a disarmingly gentle song somewhat like that of the becard *Pachyramphus cinnamomeus*. Another call is a descending rolling cackle like that of a trogon or certain antshrikes (*Taraba*, *Thamnophilus*), but weaker and softer, as though dimmed by distance and gradually fading. It is much like that of *striaticiceps*, though not so clear and musical. The species also makes at least half a dozen other sorts of sounds, some of them typically antbird-like. A few birds together may utter not unmusical barking noises. Apparently both sexes call.

The Costa Rican antvireos (*Dysithamnus*) comprise three morphologically similar species. They are small in size, stout-bodied, and stub-tailed. They are somewhat sluggish birds that usually forage in sudden flits. Between flits they perch in pseudo-idleness as they actually keep a sharp eye for prey. They inhabit the understory and the lower branches of the trees. They are sexually dimorphic in color as are the antwrens. Unlike the antwrens, they do not function as a nucleus for actively trooping, noisy bands.

Striaticiceps, however, is itself attracted to mixed bird parties.

***Dysithamnus striaticiceps* Lawrence**

STREAKED-CROWNED ANTVIREO

RANGE: Extreme southeastern Honduras to extreme northwestern Panama.

This is a Caribbean species that overlaps the Pacific slope of the northwestern divide. It is generally common in the tropical belt, except toward the end of its geographical range in the southeast, less common in the lower portion of the subtropical belt as the bird approaches its altitudinal limit. An inhabitant primarily of humid virgin forest, it spreads into contiguous, well-shaded, second-growth woodland. It keeps to the upper understory or a little above it in the trees. It is met mostly as a few scattered individuals accompanying a traveling mixed band of small birds usually dominated by antwrens. Together with its companions, this species is quite vocal, but its voice is pleasant and subdued instead of insistent or excited-sounding.

The call is a stepped whistle of two level notes, the first higher than the second, with an "ü" quality. A common utterance is a bouncing speeding roll similar to the heavier one of *Taraba* and the lighter one of *Microhopias*; it does not fade and is more musical than that of *mentalis*. The bird also makes a rippling throaty note with some of the distinctive quality of the flycatcher *Oncostoma*.

***Dysithamnus puncticeps* Salvin**

SPOTTED-CROWNED ANTVIREO

RANGE: Costa Rica to western Ecuador.

***Dysithamnus puncticeps puncticeps* Salvin**

RANGE: Costa Rica to northern Colombia.

This Caribbean species is nearly restricted to the extreme southeast near Panama. An old record from San José is questionable. Another from "Pacuare" on the Caribbean slope could apply to a straggler. In Costa Rica, at the northern limit of its geographic range, it is common in the Sixaola region, where the very similar *striaticiceps*, almost at the southern end of its range in the same region, is rare. Their weakly overlapping ranges suggest, on the one hand, that the two species replace each other ecologically.

On the other hand, the Sixaola region may be only a temporary meeting place rather than a permanent barrier. Though very similar in style of coloration and markings, the two birds have distinguishing field marks and voices. I found the present species, unlike *striaticeps*, in independent, tight little groups.

Its descending trill, very soft and rippling, is allied to the rolls of *mentalis* and *striaticeps*. Its soft "whit"'s, weaker and more rapid than those of the flycatcher *Capsiempis*, I have not heard from either of its congeners. I have no other notes on its voice.

***Myrmotherula fulviventris* (Lawrence)**

FULVOUS-BELLIED ANTWREN

RANGE: Honduras to western Ecuador.

***Myrmotherula fulviventris costaricensis*
Todd**

RANGE: Honduras to northwestern Panama.

The Fulvous-bellied Antwren, a Caribbean species, is common in the tropical belt and rises locally into the lower subtropical belt along the foothills of the Cordillera Central; a record from San José is almost certainly erroneous. It keeps to the understory, usually in the tangled or thickety portions in primary forest, and is also found in the wild undergrowth of secondary vegetation that adjoins the forest. I do not recall ever seeing it under different circumstances. Usually it is encountered in small groups of two or three to several noisy individuals traveling about actively and often associated with or joined by other kinds of small birds.

The behavior of a group combines the activities of wrens, vireos, and tits, and the birds constantly keep in touch with one another by sight and sound. This antwren clings, often upside down, to branchlets and foliage, turns from side to side when foraging along branches, or slides down a slender stem, leaning downward occasionally to examine hanging dead leaves. At times the male exposes his black-and-white checked throat by erecting the feathers, and the female, too, may puff her buff throat conspicuously.

The squeaky or otherwise unmusical notes of the species include a "call" of several "tsik"'s on the same level, a descending

short series of "tsip"'s, various hard, sharp, metallic, squeaky, chipping, or buzzy notes, and a chatter of the sort given by *Myrmeciza exsul*.

The three antwrens of the genus *Myrmotherula* in Costa Rica are warbler-sized birds, similar morphologically but differing in color and pattern, and sexually dichromatic. They often occur in small groups or bands. Behaving rather like wood warblers adapted to living in tropical forests, they appear less pleasingly proportioned, their bills are heavier and significantly hooked, their wings are short and rounded, and their tails are short, broadly rectangular, and parallel-sided. Their voices are squeaky or whining or scratchy, and the utterances are musically destitute as judged by human standards. Geographically, *fulviventris* and *axillaris* are confined to the lower Caribbean slope. *Schisticolor* lives at higher elevations on both slopes, but in the southwest, where it is the only *Myrmotherula* present, from the mountains down into the lowlands.

***Myrmotherula axillaris* (Vieillot)**

WHITE-FLANKED ANTWREN

RANGE: Honduras to Bolivia and southeastern Brazil.

***Myrmotherula axillaris albigula* Lawrence**

RANGE: Honduras to western Ecuador.

This little antwren, restricted to the Caribbean slope, is common and widespread in the lowlands. Unlike *fulviventris*, its numbers diminish rapidly above the middle of the tropical belt, and it is known from only a few localities in the lower subtropical belt, mostly on the approaches to the central highlands. It barely reaches the Pacific slope of the northwestern divide, where I found it at Tenorio Volcano.

It is extensively sympatric with *fulviventris*, and the two species are apt to travel around together. The differences in their behavior are a matter of degree. Whereas *fulviventris* usually keeps to the lower understory both in forest and tangled second growth, *axillaris* generally occurs higher, in the upper understory and above it, almost exclusively in primary forest or in canopied subforest. *Axillaris* forms larger groups, is

even more active, and appears to creep less than *fulviventrís*. The tempo of activity is warbler-like in *axillaris*, vireo-like or titlike in *fulviventrís*. *Axillaris* flits almost as rapidly as a small manakin, and both sexes, flicking their wings constantly, flash their contrastingly light-colored flanks.

All the sounds made by *axillaris* differ from those of *fulviventrís*. Its usual call, resembling that of the nearly allopatric *schisticolor*, is a set of two or three, sometimes four, fairly slow, squeaky or scratchy, somewhat nasal whines given in slightly descending order. The bird also utters a querulous series of "wee" 's.

***Myrmotherula schisticolor* (Lawrence)**

SLATY ANTWREN

RANGE: Southern Mexico to northern Peru and Venezuela.

***Myrmotherula schisticolor schisticolor* (Lawrence)**

RANGE: Southern Mexico to western Ecuador.

The Slaty Antwren is distributed along both slopes in the humid life zones, undoubtedly inclusive of the southeastern sector of the country, though not yet reported from there. Unlike its congeners it is primarily an inhabitant of the subtropical belt, from which it ranges upward into parts of the lower montane belt and downward rarely below the upper limits of the tropical belt on the Caribbean side. In the southwest, however, it does occur in the tropical belt, especially in the T rraba drainage and the Golfo Dulce region.

It parallels *fulviventrís* in occupying the understory in woodland, but differs somewhat in keeping closer to the ground, often in the undergrowth. Its foraging habits, including a xenops-like clinging, are like those of the other species, but it does not occur so regularly in groups, and it often leans sideways over branchlets to search their under sides, in the manner of a tanager. Its flash or recognition mark appears to be the white patch revealed as the wings open and shut at their junction with the body.

What may be its "song" is a reedy "toor toor" or "tir tir" related to the two-level "tsee tsir" of *axillaris*. The bird also utters

patterned sets of squeaky or metallic notes as well as similar single-note squeaks, squeaky whines, and nasal sounds. One of the squeaks is almost as sharp as that of the flycatcher *Platyrinchus mystaceus* or the leaf-scraper *Sclerurus guatemalensis*.

***Microrhopias quixensis* (Cornalia)**

DOTTED-WINGED ANTWREN

RANGE: Southern Mexico to Bolivia and Brazil.

***Microrhopias quixensis virgata* (Lawrence)**

RANGE: Nicaragua to central Panama.

This is the most widespread and probably most abundant antwren in the country. Its range, covering the humid lowlands of both slopes (hence excluding the Pacific northwest), hardly exceeds the upper tropical belt; I found it, locally, at about 3000 feet in the southwest and at the base of Tenorio Volcano in the northwest. Though occurring with *Myrmotherula* spp. in forest, where it seldom rises well above the understory, it is much more plentiful outside the forest. It evidently prefers tall thickets and other second growth in partially cutover areas, where it keeps from eye level to the tops of the thickets; sometimes it visits brush in the nearby open.

It forms small bands that travel about, usually alone in the semi-open but often in company with other species inside the forest. As is the case with other gregariously trooping birds, the bands are met the year round, though individuals pair off to nest and become sedentary. What seems to be sexual display is carried on by the group as a whole. The birds become so excitedly preoccupied that they pay no attention to the observer a few feet away. The males, half-spreading their wings and fanning their tails to expose the white markings, fluff the normally concealed white of the upper back into a downy hump, which rests contrastingly against a black ball of feathers that appears at this time in the middle of the back. Usually gentle-voiced, the birds now scratch out a succession of throaty chatters irregularly sprinkled with peeping notes.

Unlike the *Myrmotherula* antwrens, this bird utters musical chips and soft trills. The usual trill or roll, pitched higher than the

somewhat similar call of *Cercomacra tyrannina*, is patterned almost exactly like the calls of *Taraba major* and *Dysithamnus striaticeps*, but it is lighter and sweeter. In addition to sweetly whistled peeps and cheeps, it makes mewling and other noises.

***Cercomacra tyrannina* (Sclater)**

TYRANNINE ANTIBIRD

RANGE: Southern Mexico to western Ecuador and eastern Brazil.

***Cercomacra tyrannina crepera* Bangs**

RANGE: Southern Mexico to western Panama.

The Tyrannine Antbird has a broad vertical range for a formicariid, from sea level almost to the lower montane belt along both slopes. It is common in both the humid-forested tropical and lower subtropical belts, above which it becomes infrequent. It is uncommon to rare in the Tropical Dry Forest, where it is not known north of the lower Tempisque basin, but fairly common along the Pacific-facing slopes of the Guanacaste Cordillera, upon which it has spilled over from the Caribbean side. Its status on the Cordillera de Tilarán is unknown. I can find no report from the central plateau.

Though usually found near forests, the species seldom penetrates tall woodland beyond its borders. It keeps within a few yards of the ground in thickets, shrubbery, and dense new growth along roads and trails, streams, woodland edges, and in abandoned agricultural lands; sometimes it goes to the ground. Uniformly found in pairs, the bird is sedentary, not overly shy, rather slow-moving, and flies seldom. Somewhat wrenlike, yet sedate in its actions, it creeps through the tangles, hops among the branchlets, or clings sideways to stems as does an ovenbird. The sexes are differently colored as in all nonforest Costa Rican antbirds (but see *Grallaria fulviventris*).

The species is heard far more often than seen. Its call is a musical yet rattling or bouncing trill of one to three slow notes followed by 10–15 faster ones: “byou, byou, byou-byou·byou·byou·beeppeepeepee” or “be-be-be-bebebebebebebe,” the type of call given by several other antbirds and the jacamar *Galbula ruficauda*. It also has a similar

but shorter and harder call of half a dozen or so syllables. It makes a number of other cries, some of them distinctive and given frequently by both sexes.

***Gymnocichla nudiceps* (Cassin)**

BARE-CROWNED ANTIBIRD

RANGE: Guatemala to northern Colombia.

Gymnocichla nudiceps chiroleuca

Sclater and Salvin

RANGE: Eastern Guatemala to southeastern Costa Rica (and probably adjacent Panama).

***Gymnocichla nudiceps erratilis* Bangs**

RANGE: Southwestern Costa Rica and adjacent Panama.

The Bare-crowned Antbird inhabits the humid tropical belt on both slopes. On the Caribbean side, *chiroleuca* occurs not uncommonly throughout the lowlands, but its numbers decrease sharply with increasing altitude, so that it is already rare at the transition to the subtropical belt. It does not cross the northwestern divide. On the Pacific side, where it occurs southward from the southern end of the Tropical Dry Forest, the center of abundance of *erratilis* is the General-Térraba-Golfo Dulce sector, from the lowlands to the lower limits of the subtropical belt. Adult specimens of the two races are easily separable, but the living birds are virtually identical in voice, habits, and habitat.

Although resident in forested country, it is a nonforest species that must be sought in suitable surroundings: young and intermediate secondary vegetation, such as impenetrable thickets, wild jungly growth in abandoned clearings, extensive bushy mats, or the vine-tangled understory a little inside thinned woodland and subforest. A sedentary bird that usually occurs in scattered pairs, it is often heard but hard to see. But since it is a confirmed army-ant attendant, several individuals may be found scattered among other birds that accompany the spreading columns at the tangled forest border. There it meets the faithful forest-inhabiting followers, *Gymnopithys*, *Hylophylax*, and *Phaenostictus*, on the Caribbean slope, *Gymnopithys* in the southwest. It is the only member of the

quartet present in more open situations, being found together with the tanager *Eucometis* in the southwest and, in surprising abundance, in the Río Frío region. In common with the above-mentioned antbirds it constantly raises and lowers its tail. Unlike them it accents the downbeat, whereas the others all jerk the tail on the upbeat, and it shows strong sexual dichromatism.

Its call consists of about eight loud and rich "cheep" 's, the first several of which are given individually and the last speeded and run into one another; it brings to mind the more rapid, less musical call of *Cercomacra*. The bird also makes a strong "chickling" or "twickling" chatter, somewhat descending but similar to that of *Myrmeciza exsul*, a weakening trilling rattle like that of the manakin *Pipra coronata*, a weakly whistled whining note, and other sounds.

***Myrmeciza exsul* Sclater**

SCLATER'S ANT BIRD

RANGE: Nicaragua to western Ecuador.

***Myrmeciza exsul exsul* Sclater**

RANGE: Eastern Nicaragua to western Panama.

***Myrmeciza exsul occidentalis* Cherrie**

RANGE: Pacific slope of Costa Rica and western Panama.

Sclater's Antbird, widely distributed along both slopes from sea level to the lower subtropical belt, is present in greatest numbers at the lower elevations in the humid life zones. It is uncommon to rare in the Pacific northwest, where it is not known north of Las Cañas. Largely an inhabitant of heavy forest, it also occurs in shaded second growth. It dwells close to the forest floor, in undergrowth or in brush, and is often found at wet places in the forest.

It occurs alone or in pairs, never in pure groups, and many individuals are usually scattered about. A sedentary species, it apparently frequents a sharply circumscribed home range. As with so many other birds, whether solitary or gregarious, it becomes progressively less shy as the concentration of individuals increases. Typically, it perches sideways for a moment or two low upon a

stem or root, constantly raising its tail slowly and lowering it with a jerk, as does *Gymnochla nudiceps*, for example. Semiterrestrial, it hops on the ground, where it may flick aside decaying leaves in the manner of a leaf-scraper. The activities of army ants offer no special appeal. The bird may take part in the general excitement when the ants are passing through its territory, but it does not form into bands or join the retinue of followers. The male of this dark-colored species has a narrow white line along the wing bend, as do many other birds. Somehow this line becomes brightly sharp and conspicuous when he displays with drooping wings in the presence of a female.

The distinctive call consists of either two or three deliberate, short, and level whistles possessing a "kyew" quality. If two-noted, the second note is distinctly lower; if three-noted, the first two notes are on the same plane, and the third is distinctly lower. This call could be confused with that of its neighbor, the ant-thrush *Formicarius analis*, which is accented differently. The Graceful Trogon, which may call similarly, does not accent any one note. This antbird makes several other cries, but I never heard it whine.

***Myrmeciza laeosticta* Salvin**

SALVIN'S ANT BIRD

RANGE: Costa Rica to northwestern Ecuador and western Venezuela.

***Myrmeciza laeosticta laeosticta* Salvin**

RANGE: Costa Rica and western Panama.

This rare species is confined to the Caribbean slope, where it apparently occurs mostly in hilly terrain in the upper tropical and lower subtropical belts along the forested foothills that front the cordilleras of the country. It has been recorded from the continental divide in the northwest and the Sixaola region in the southeast, but most records pertain to the eastern edge of the Cordillera Central. Carriker (1910, p. 618) characterized it as "inhabiting the heavy, dark, humid forests . . . along the sides of some dark, damp ravine, on the ground or in the low bushes," and the only bird that I found was in such a place. Its humid habitat and general habits would appear not to differ grossly from those of *exsul* in the tropical belt.

***Myrmeciza immaculata* (Lafresnaye)**

IMMACULATE ANTIBIRD

RANGE: Costa Rica to western Ecuador and western Venezuela.

***Myrmeciza immaculata zeledoni* Ridgway**

RANGE: Costa Rica and western Panama.

The Immaculate Antbird is fairly common in cool wet forest on the Caribbean slopes and foothills of the central highlands, the Dota Mountains, and the Pacific slope of the Talamanca Cordillera. It has not been reported from the northwestern divide, where it may not be present, or the Caribbean side of the Talamanca Cordillera, where it almost certainly is. Primarily an inhabitant of the subtropical belt, it also rises higher into the lower montane belt. In the tropical belt it is known from three localities in the wet-forested northeastern sector: two of them at the foot of the Cordillera Central, the third at the edge of the Sarapiquí lowlands, under climatic conditions that approach or are perhaps transitional with those of the wet subtropical belt. I collected the Sarapiquí bird, a lone wanderer from the central volcanic massif, out of a mixed band of formicariids attending army ants.

The species inhabits heavily shaded undergrowth in forest. It occurs typically in lively, noisy, pure groups, made up of both sexes, that move rapidly through the low vegetation in wing-assisted long leaps from one to several yards in length. Either sex flashes a white patch at the bend of the wing when in motion. The long rounded tail, which is considerably longer than that of *exsul* or *laemosticta*, is constantly raised slowly and lowered quickly. The species is evidently an inveterate follower of army ants.

Its arresting call is a level series of six to eight resonant, musical, equal-valued, urgent or excited "beep" 's. The bird also makes a high-pitched chatter like that of *exsul*, as well as of several other kinds of birds, and an oven-bird-like hard and sharp "squick" or "squeep."

***Formicarius analis* (d'Orbigny and Lafresnaye)**

BLACK-FACED ANTTHRUSH

RANGE: Southern Mexico to Peru, Bolivia, and Brazil.

***Formicarius analis umbrosus* Ridgway**

RANGE: Nicaragua to northwestern Panama.

***Formicarius analis hoffmanni* (Cabanis)**

RANGE: Pacific slope of Costa Rica and adjacent western Panama.

This, the common antthrush of Costa Rica, inhabits the humid life zones along both slopes. It seems to be quite absent from the dry-forested Pacific northwest despite a report from Bagaces by Carriker (1910, p. 624), who listed a specimen in the Carnegie Museum. However, no such specimen is present in that institution (K. C. Parkes, personal letter, September 5, 1962).

The Caribbean *umbrosus* is primarily an inhabitant of the tropical belt the length of the country. Here and there it rises into the lower subtropical belt along the central highlands, probably also on the Talamanca Cordillera, and overlaps the northwestern divide north of the Arenal gap, reaching the upper tropical belt on the humid Pacific face of the Guanacaste Cordillera. The Pacific southwestern *hoffmanni* occurs throughout the lower elevations and rises very commonly to at least 4500 feet on the Talamanca Cordillera. In addition, I took a specimen (U.F.C. No. 8631) at 4400 feet near Monteverde on the Pacific face of the Cordillera de Tilarán, where it was common, thus extending its range northward to, probably, the Arenal gap. This bird, clearly referable to *hoffmanni*, is exceptionally light-hued. Its pale gray under parts can be matched, in the American Museum of Natural History, by only one bird taken at a similar elevation at Cañas Gordas next to Panama. In color of upper parts it differs from all others, nearly every one of which is unquestionably foxed. Its under tail coverts are so light a cinnamonaceous that they are equaled only in nominate *analis* of South America.

This antthrush is primarily a forest species that also enters nearby shaded second growth, hardly ever thickets. Yet in the Río Frio region I found it not uncommon in scrubby subforest far from tall woods. Singly, also in two's or three's, it frequents the relatively open parts of the woodland floor and is as terrestrial as a tinamou and

often as hard to see. As a rule, however, it is not particularly wary and may even approach the observer closely when he stands still. Disturbed, it walks away rapidly at an angle from the source of possible danger and quickly becomes screened from sight. It takes flight only when unduly startled. Normally it struts about like a stub-tailed bantam or little rail, with little head bobbing, and the flicking of its erect short tail at each step accentuates the deliberateness of the pace. It never hops and when in a hurry cocks its tail forward and moves in fitful walks or little runs. During its rambles the bird does not climb over obstructions, such as a fallen trunk, but passes around or under them. It stops from time to time, throws back its head, and, like a midget rooster, delivers its cry. Rarely, a bird may be seen walking sure-footedly along a low branch with no sign of discomfort. A bird seen fairly high above the ground, as upon a rotten stub, is probably near its nesting site.

This antthrush is responsible for one of the most common woodland sounds, a three-note call which I associate with the dark forest just as I do the forest with the dark quality of the call. The first note is always a step higher than the next two or, with lesser frequency, three notes given on a lower level. The individual note sounds like "kyew," "kwüp," "chyew," or "chew," and the entire call, "kyéw, kyew·kyew." The same pattern holds when occasionally a long string of syllables is uttered, with quite different effect. Several neighboring species have calls similar in quality though not in precise pattern, especially that of *Myrmeciza exsul*. I have heard only one other cry, a two-syllable "chiroóp."

***Formicarius nigricapillus* Ridgway**

BLACK-HEADED ANTTHRUSH

RANGE: Costa Rica to western Ecuador.

***Formicarius nigricapillus nigricapillus* Ridgway**

RANGE: Costa Rica and western Panama.

Carriker (1910, p. 621) wrote: "I was never able to secure specimens of this rare species, so know nothing about the bird in life. However, from what I have been able to learn I should say that the range of this species covers the foothill region of the Caribbean slope from about 1,200 up to 2,500 feet, and

that it is undoubtedly found in the dark humid forests peculiar to the foot-hill region, like some other species of the *Formicariidae*." I was no luckier and never found it in the field.

The species has been recorded from several localities on the northern and eastern sides of the Cordillera Central and from the Cerro de Santa María in the Guanacaste Cordillera; it has not yet been found in the southeast. This distribution makes it almost exclusively a Caribbean species confined to the upper tropical and lower subtropical belts.

***Formicarius rufipectus* Salvin**

RUFIOUS-BREASTED ANTTHRUSH

RANGE: Costa Rica to western Ecuador and eastern Peru.

***Formicarius rufipectus rufipectus* Salvin**

RANGE: Costa Rica and Panama.

This rare species is known from four localities (La Hondura, Guayabo, Juan Viñas, Navarro) along the northern and southeastern Caribbean-facing slopes of the Cordillera Central and adjoining hills, where it seems to be confined to the middle and upper portions of the subtropical belt. It would appear to be partially, perhaps largely, sympatric with the congeneric *nigricapillus* and *analís*. I did not find it. The following remarks by Fuertes (1914b, p. 166) for another population may be pertinent: "The . . . Colombian form of *F. rufipectus* has two sharp whistles, the last a semitone above the first. This, in our experience, was never varied." Hence the species would appear to have a call like that of the congeneric *analís* but with the pattern reversed.

***Gymnophrys leucaspis* (Sclater)**

BICOLORED ANTIBIRD

RANGE: Honduras to Peru and western Brazil.

***Gymnophrys leucaspis olivascens* (Ridgway)**

RANGE: Honduras to western Panama.

The Bicolored Antbird is distributed over most of the country with the exception of the subhumid northwestern lowlands. It is generally common throughout the tropical belt, locally so to at least 4000 feet in the subtropical belt, and reaches an upper limit of

perhaps 5000 feet. It dwells almost exclusively in humid primary forest from which it occasionally follows army ants into adjoining second-growth woodland. I have never seen it moving above the lower understory. It occurs in social groups of several to a dozen or more individuals that accompany army ants so faithfully that they seem to be obligatory attendants. Sometimes a single bird, possibly a member of a breeding pair, is encountered. Notwithstanding, bands are seen at all times of year.

Periodically, whining sounds can be heard issuing from all sides in the forest and small- to medium-sized, brown-backed birds glimpsed dashing about in the undergrowth. The observer then does well if he looks at his feet to make sure they are not alive with crawling ants, the deploying advance of which he may be blocking. Usually the most conspicuous bird in the melange is the Bicolored Antbird. The other members, in varying combination in different parts of the country, include the formicariids *Hylophylax*, *Phaenostictus*, *Myrmeciza immaculata*, various woodhewers (especially the dendrocinclas and *Dendrocolaptes certhia*), the tanager *Eucometis*, often the so-called ant tanagers (*Habia*), and sometimes the rare ground cuckoo *Neomorphus*. The small forest falcon *Micrastur ruficollis* may be waiting in the outskirts to add an element of suspense to the proceedings. As with most gregarious birds, especially when of mixed company, the infectious excitement rather than the activities of the ants may be responsible for attracting still other kinds of birds to the scene of commotion.

The Bicolored Antbird, in numbers and noisy activity, provides the assemblage with leadership (except at the northwestern divide, where *Hylophylax* takes over, and the Río Frío region, where *Gymnocichla* and *Eucometis* replace it). It flits about freely together with its regular companions in apparent unconcern. Perched boldly on low branches or clinging sideways to a stem a few inches above the swarm, it waits to select a choice tidbit attempting frantically to escape the ants, it makes sudden two-part dashes to snap prey from foliage, and it regularly drops to the ground amid the swarm. Ants may crawl over its plumage, but the bird pays no

attention. Its half-spread tail is constantly in motion, sweeping slowly downward, then jerking up to the level of the back.

Its wild little call is a "beeping" trill or sweet-noted cackle beginning with several "beeps" that speed up and rise in pitch before slowing and falling in pitch; sometimes it ends scratchily. The jacamar *Galbula* and the antbirds *Phaenostictus* and *Gymnocichla* have rather similar cries that begin the same way but neither descend nor decelerate. This "beep" call may also be delivered very softly, with a whining quality. As characteristic as the call and as easily identified is the soft whine of the bird, a nasal *myahr*. Among its other sounds are the typical whining "ank ank" of an antbird and a strong "tchitchích."

***Hylophylax naevioides* (Lafresnaye)**

SPOTTED ANTbird

RANGE: Honduras to western Ecuador.

***Hylophylax naevioides capnitis* (Bangs)**

RANGE: Honduras to northwestern Panama.

The Spotted Antbird, a Caribbean species, is found throughout the tropical belt and rises in diminishing numbers into the lower portion of the subtropical belt. Although common in the lowlands and foothills on the eastern side of the country, it is extraordinarily abundant at a mean elevation of 2000 feet on the western face of the northwestern divide, particularly the Guanacaste Cordillera, to which it has spread through low places from the Caribbean slope. The species is absent from all the rest of the Pacific side of the country. Occurring only in heavy forest, it is virtually restricted to the lower understory. Occasionally it is seen as high as 25 feet in the trees; it drops to the ground only for the instant required to secure prey.

This is one of the few Costa Rican formicariids that faithfully follow army ants. Nevertheless, the bird does not obtain all its food in this manner. Whereas *Gymnopithys* and *Phaenostictus* are seldom found away from the ants, *Hylophylax* is scattered widely, alone or in pairs, all through the forest. But along the humid-forested lower slopes of the continental divide in Guanacaste, as mentioned above, it is the most conspicuous attendant. There it forms larger bands than

those of *Gymnopathys*, even replacing it in some localities.

In the presence of the ants the birds quicken as though infected by high excitement. Individuals dash about, pause to perch sideways on stems, generally from below eye level to just above the marauding ants on the forest floor, and utter their calls. The short rounded tail, marked like a double-bordered little fan, is constantly lowered slowly, then raised with a jerk. Each jerk seems to express an impulse to flit away, each slow lowering a renewed intention to remain. At these times what appears to be a contagious stimulation to display grips many individuals. Both sexes, which are similar but not identical, perform alike. The usual sideways clinging and the jetting of the spread tail are combined into an integrated maneuver as the birds revolve on their vertical perches in jerky spurts punctuated by fantailed sweeps. The hidden white of the back now lies exposed, and the necklace of black drops rests as though embossed upon the white breast.

This antbird utters a Veery-like (*Hyloichla fuscescens*), spirally descending series of notes—"weez aweez aweez aweeza"—diagnostic of the species. This call is delivered rather weakly and has a captivating gentleness. The bird makes several other cries, some of them more antbird-like.

Phaenostictus mcleannani (Lawrence)

OCELLATED ANTTHRUSH

RANGE: Southeastern Honduras to northwestern Ecuador.

Phaenostictus mcleannani saturatus (Richmond)

RANGE: Southeastern Honduras to extreme northwestern Panama.

The Ocellated Antthrush is a Caribbean species distributed throughout the forested tropical and lower subtropical belts, seldom higher. It laps over the northwestern divide from Tenorio Volcano northward to Rincón de la Vieja Volcano and locally follows the forested slopes downward to about the middle of the tropical belt; it is not yet known from the Cordillera de Tilarán. Only occasionally does it leave mature forest for bordering advanced second growth.

This antbird keeps in groups in the lower understory and, with *Gymnopathys* and *Hylo-*

phylax, helps comprise the Caribbean trio of faithful army-ant attendants that generally, but not always, flock together. Considerably larger than *Gymnopathys* and several times larger than *Hylophylax*, it is less common, much harder to see, and is a differently formed, long-tailed, brightly patterned species with long legs and toes that are conspicuously whitish and a bill that seems to droop. Its tail is constantly raised and lowered, with the accent on the upbeat.

Its call bears a strong resemblance to that of its companion, *Gymnopathys*, but differs in being two-parted. It rises and at the same time accelerates, then, passing over the top, so to speak, takes either a quick or a slow fall through several notes. It may be abbreviated to a simple upscale series ending with a weak, dropping note. Its other cries are antbird-like, scratchy "miaow" 's, a "weeing" whistle, and a sibilant whistle.

Pittasoma michleri Cassin

BLACK-CROWNED ANTPITTA

RANGE: Costa Rica to northwestern Colombia.

Pittasoma michleri zeledoni Ridgway

RANGE: Costa Rica and northwestern Panama.

This rare bird, a Caribbean species, has been recorded from wet forest in the upper part of the tropical and the lower part of the subtropical belts along the northern slope of the Cordillera Central and from an adjacent locality at much lower elevation at the base of the east-central foothills. It has been reported also from the extreme southeastern Sixaola region. Carriker (1910, p. 627) observed: "It is not found in the lowlands, only from the beginning of the foothills up to about 2,500 feet. . . . It is very shy, and not entirely terrestrial, as I have seen it perched on low limbs at least six feet from the ground." I did not find it.

Grallaricula flavirostris (Sc Slater)

OCHRACEOUS PYGMY ANTPITTA

RANGE: Costa Rica to western Ecuador and Bolivia.

Grallaricula flavirostris costaricensis

Lawrence

RANGE: Costa Rica and western Panama.

The pygmy antpitta has been found along the Caribbean versant of the central highlands, in the Dota region, and on the Pacific side of the Talamanca Cordillera, always in very humid portions of the subtropical belt. It has not been recorded from the northwest, where it may not occur, or from Caribbean Talamanca, where it probably does. The bird is seldom encountered, perhaps because it apparently keeps in highly localized small concentrations. It was not rare in the three localities at which I found it: a 3000-foot ridge that overlooks the Río Reventazón, and two sites, similar physiographically and climatically to the last, along the Talamanca Cordillera in the southwest.

A forest species, it inhabits leafy shrubbery in denser portions of the understory. It does not occur above eye level, nor have I ever seen this long-legged, almost tailless little bird actually on the ground. I met it only singly, but several individuals, as evidenced by voice, may be scattered over a suitable area. It seems to be quite sedentary, relatively inactive, and not particularly shy. But its small size, its habit of sitting still on a branch, and the nature of the habitat make it very hard to see. In common with other birds of the forest understory, it has a very large eye, which the prominent eye ring, as in *Grallaria perspicillata*, makes appear still larger. Its gargled call is reminiscent of that of *Grallaria fulviventris*, but it has a rattling quality and descends slightly.

***Grallaria guatemalensis* Prévost and Des Murs**

SCALED ANTPITTA

RANGE: Central Mexico to Peru and northern Brazil.

Grallaria guatemalensis princeps

Sclater and Salvin

RANGE: Costa Rica and western Panama.

In contrast to most Costa Rican formicariids, the large Scaled Antpitta is almost if not entirely restricted to the cool subtropical belt. A Caribbean species, it is known from the foothill approaches and slopes of the central highlands, including the northern portion of the Talamanca Cordillera, and it overlaps the northwestern divide from Tenorio to Rincón de la Vieja volcanoes. It has been recorded also from the hills, technically

on the Pacific slope, that border the central plateau on the south. Its distribution is probably continuous along the eastern cordilleran slope into Panama.

This antpitta is a seldom-encountered forest inhabitant. It is almost entirely terrestrial, though when disturbed it may fly to a log or a low branch as does a wood quail. Normally it progresses in leaping, springy hops. Frequenting both the forest floor and broad open trails and cuts through forest, the bird apparently seeks muddy ground bordered by dense undergrowth that affords immediate refuge. Possibly this is where it forages habitually, as its heavy beak is often coated with mud. I have only seen it singly. I do not know its voice.

The three species of *Grallaria* in Costa Rica are stout-bodied, long-legged birds with stubby tails nearly concealed by the folded wings. They appear larger than their actual size, because the bulk of the body occupies most of its length, while the long legs give added height. The slender legs are set at the rear of the body, so that the backs of the "knees" almost touch the inconspicuous tail. An obtuse angle is formed between body and legs, as both are inclined about 30 degrees at opposing angles from the perpendicular. The neck is short, the head broad, and the liquid eye very large and black. *Guatemalensis*, which is relatively very large, ranges in the cool and wet lower middle altitudes. *Fulviventris* and *perspicillata* are tropical-belt species that overlap ecologically and are sympatric on the Caribbean slope. They may occur side by side where their habitats meet, but these differ as markedly as their habits and voices.

***Grallaria fulviventris* Sclater**

FULVOUS-BELLIED ANTPITTA

RANGE: Nicaragua to Ecuador.

***Grallaria fulviventris dives* Salvin**

RANGE: Nicaragua and Costa Rica.

This antpitta is a Caribbean species nearly restricted to the tropical belt, above which it rises slightly along the Reventazón Valley and probably elsewhere. It barely overlaps the northwestern divide at Lake Arenal, where I found it fairly common at two sites; it probably occurs at other low gaps in the

Guanacaste Cordillera. Occasionally it penetrates forest, seldom deeply and usually along thicket-bordered streams or tongues of cut-over jungly woodland that merge with high forest. In the forest it is sparsely dispersed in isolated thickety patches open to the sky. Its preferred habitat, however, is in the semi-open beside wooded tracts. Here the bird is resident in young and intermediate second growth, whether tangled, leafy, impenetrable mats regenerating in an abandoned clearing, or dense heliconia thickets, or overgrown borders of advanced, shaded second growth. The species remains in such a site until the undergrowth thins as a canopy is formed and casts its shade, then it moves on.

The bird seems to be solitary and keeps low in the protection of the foliage and intertwining branchlets. I saw it on the ground only when two individuals, probably a mated pair, were calling back and forth and chasing each other in a relatively uncluttered area within advanced, open, second growth, where normally I would not expect it. The calling bird takes the same odd stance as *perspicillata* (see below), but its note, a subdued even gargle, bears no resemblance to the calls of *perspicillata*. Sometimes it begins with a throaty scratch or a whistling intake of breath, so to speak; sometimes it has a rattling quality. The bird also gives a short, heavily whistled "hoo" like that of the tinamou *Crypturellus cinnamomeus*. This single "hoo," usually heard issuing from a thicket, may also introduce or merge with the gargled call.

***Grallaria perspicillata* Lawrence**

SPECTACLED ANTPITTA

RANGE: Nicaragua to western Ecuador.

***Grallaria perspicillata intermedia* Ridgway**

RANGE: Nicaragua to northwestern Panama.

***Grallaria perspicillata lizanoi* Cherrie**

RANGE: Pacific slope of southern Costa Rica and western Panama.

The Spectacled Antpitta occurs largely in the humid-forested tropical belt along both slopes. It barely ranges into the subtropical belt in most places, yet is not uncommon

along the northwestern divide, where it laps slightly onto the Pacific slope from the Caribbean side, and rises to at least 4000 feet in the far southwest beside Panama. It is absent from the dry-forested Pacific lowlands. Confined to "rain" forest, it prefers the relatively open portions of the forest floor to tangles, thickets, or brush.

The species is retiring in habit and solitary in disposition, but is sometimes seen in probably mated pairs. Each individual seems to be resident in a restricted forest area in which it roams about freely. A terrestrial bird, it flies only when frightened, and then not far, in a low fluttering dash; usually it strikes an immobile pose or simply walks away quietly. When standing still, it may fluff the feathers of its under parts and expand and deflate its body like a balloon, its wings spreading slightly apart at each swell of the chest. Ordinarily it progresses in rapid hops like a thrush, but it may also patter delicately and come to sudden stops like a little plover.

The bird has two principal calls which it gives at frequent if irregular intervals, but not interchangeably. One, heard far more commonly than the other, is a somewhat deliberate series of up to 10 similar notes, "pew" or "pow" or "poo," that rises slightly in the faster middle portion. At close range the notes seem to pass through a catch in the throat and their quality is similar to that of its neighbors, the antbirds *Formicarius analis* and *Myrmeciza exsul*. This call suggests that of a tinamou without quavers or the extended one of *Formicarius analis* without its keynote. To my surprise I discovered a second call, which I transcribed as "peé·chyüchyüchyü·chyüchyü," and so on. A prolonged effort, with no real pause after the short, grating, introductory "pee," it sounds like a slightly downscale warble that weakens as though the bird were running out of breath. This species usually calls from a slightly elevated perch, such as a log or a low branch, holding its head still while sliding its body up and down the axis of the neck in time with the notes. The congeneric *fulviventris* making its gargle stretches its neck by lowering its body a little, keeps it lowered while calling, then a slight pause and the body returns toward the head.

FAMILY RHINOCRYPTIDAE

Scytalopus argentifrons Ridgway

SILVERY-FRONTED TAPACOLA

RANGE: Costa Rica to west-central Panama.

Scytalopus argentifrons argentifrons Ridgway

RANGE: Costa Rica and adjacent western Panama.

The Silvery-fronted Tapacola inhabits the cold and wet higher parts of the country. As presently known, it is most abundant in the central highlands. Carriker (1910, p. 595) found it quite common above Ujarrás de Térraba on the Talamanca Cordillera, along which it is probably continuously present into Panama. In addition, I found it in mist-drenched mossy forest on the crest of the Cordillera de Tilarán; it is not reported from the Guanacaste Cordillera. Occurring mostly upward from 5000 feet or so in the lower montane belt to timber line, it descends locally into the rain-forested upper subtropical belt, as at La Hondura, Navarro, and the Tapantí region. Below the mountaintops in the central part of the country, it is most common on the Caribbean-facing slopes.

A solitary bird, yet one that may perhaps occur in pairs, it keeps at or below eye level along streamsides, banks, gullies, and ravines in the cloud-forested highlands. It is at home in damp brush and piled trash in impenetrable undergrowth, inside which it creeps and hops about like a wren. The bird seems to be quite sedentary in its dark and dripping habitat. It is secretive yet shows curiosity in the same way as a wren.

The species usually gives a chatter of about six rapid notes that is sort of rattling and very wrenlike. Hardly different in character is a prolonged rattling nasal chatter of up to 70 notes or more: "cht·cht·cht·cht·cht," and so on. This call may be introduced by a twittering snort. I have not heard the musical utterance reported by Carriker (1910, p. 332.)

FAMILY COTINGIDAE

Cotinga amabilis Gould

LOVELY COTINGA

RANGE: Southern Mexico to Costa Rica. The Lovely Cotinga, so far as known, is confined to the central and southeastern sec-

tors of the Caribbean slope, from about the middle of the tropical belt to the middle of the subtropical belt. The known localities almost all lie in a belt that curves around the eastern end of the central highlands from the northern base of the Cordillera Central to the hilly country south of Cartago. A record from "Talamanca," near Panama, represents the southernmost limit of the species.

The bird is rarely encountered except, as noted by Carriker (1910, p. 676), "when it comes to certain fruit-bearing trees to feed in company with other cotingas." I have also found it in company with the more common *Carpodectes nitidus* at the border of heavy forest in the foothill region. Primarily an inhabitant of tall virgin forest, it frequents the canopy normally in small groups that perhaps wander aimlessly or follow regular foraging rounds.

The genus *Cotinga* in Costa Rica is represented on the Caribbean side by the uncommon *amabilis*, which may be more plentiful than casual encounters indicate, and on the Pacific side by the common *ridgwayi*. Though the males are brilliant blue, they are not conspicuous when sitting on foliated branches, usually well up in the taller trees. Both species forage in bursts of activity, plucking tree-borne fruits during a quick hover, then dropping to the nearest perch. The dipping flight, similar to that of a woodpecker, suggests they do not fly far; their short-tailed proportions are woodpecker-like in silhouette. The high forehead gives them a somewhat dovelike look, especially the females, and the birds sometimes exhibit a dovelike exaggerated nodding.

Cotinga ridgwayi Zeledón

RIDGWAY'S COTINGA

RANGE: Southwestern Costa Rica and adjacent Panama.

Ridgway's Cotinga is a southwestern species that inhabits the humid life zones southward from the entrance to the Gulf of Nicoya. It is fairly common in the General-Térraba-Golfo Dulce sector from the coastal lowlands to, locally, at least 4500 feet. Its preferred habitat, as that of *amabilis*, lies along the foothills and lower slopes of the mountains. Much more abundant than *amabilis*, it is not only comparatively plentiful in the subtrop-

ical belt, but it also occurs in the coastal lowlands, as *amabilis* apparently does not. It does not impress me as being quite so restricted to tall forest as the Caribbean bird, but this may be a reflection of its greater abundance.

Although present only in forested areas, it is usually met in forest openings, along the forest border, in patches of thinned woodland, and in adjacent semi-open terrain where tall trees rise from second-growth vegetation. I found it even in mangroves, together with *Carpodectes antoniae*, at the head of the Golfo Dulce. Generally the bird keeps high in the trees, both on lofty bare branches of tall ones and the crowns of medium-sized ones; occasionally it perches openly on a semi-isolated shrub or stub. Males and females are seen singly, in two's of the same or opposite sexes, and in small groups that contain a few individuals of both sexes. The groups seem to circulate about in an area.

This cotinga makes in flight a rapid rattling "yutititit," similar to the call of a neighbor, the tanager *Piranga flava*. The number and rate of the syllables coincide with those of the wing beats during each dip in the festooning flight. This riffing sound, which I associated only with flying males, is produced mechanically, not vocally. In this species, but not in *amabilis*, the males have the outer primaries markedly shortened and narrowed. Its only vocal sound, so far as I know, is a high-pitched thin and level whistle lasting almost a full second.

***Carpodectes nitidus* Salvin**

SNOWY COTINGA

RANGE: Honduras to northwestern Panama.

The fairy-like Snowy Cotinga of the Caribbean slope occurs throughout the tropical belt, excepting perhaps the flat coastal lowlands. It barely rises into the subtropical belt, where it is known from a few localities grouped along the eastern edge of the central highlands. It inhabits virgin forest, especially on broken, hilly terrain, and troops about in groups through or above the canopy, probably in search of fruiting trees. It regularly visits clearings or plantations with tall shade trees adjoining the forest. Here the bird occurs either singly or in small groups of several separated individuals, usu-

ally in the upper branches of the taller trees, and I have seen a flock of up to 10 or more birds (all males) exploding parrot-like out of a crown. Also, I have seen lone individuals perched only 15 feet up in small, sparsely foliated trees in the semi-open.

The bird flies well, in the direct manner of an arboreal pigeon, usually toward a lofty perch; occasionally it is seen in high, rapid, and, so to speak, purposefully sustained flight, when it is quickly lost from sight. Sitting quietly on a bare branch or screened by foliage, the bird can often be approached closely. The high forehead imparts a gentle, dovelike, dreamy expression to this cotinga, which has the habit of looking around slowly by means of a deliberate, lethargic head turning. A bird may lean down nonchalantly to pluck food from the foliage, it may hop along branches or inside the leafy cover, or it may feed on the wing in the spectacular manner of a hovering plucking trogon.

The seldom-heard call consists of two to six rapidly repeated, short-voweled notes, between "chü" and "chee," having the quality of the call of an oriole.

***Carpodectes antoniae* Zeledón**

ANTONIA'S COTINGA

RANGE: Pacific slope of southern Costa Rica and western Panama.

Antonia's Cotinga, the Pacific representative of *Carpodectes* in Costa Rica, is confined to the humid-forested tropical belt in the southwest, from the entrance to the Gulf of Nicoya south to the Golfo Dulce region. It is known from only four areas, all coastal: Pigres, Río Palo Seco, Pozo Azul de Pirrís, and, much farther south, Rincón de Osa and Puerto Jiménez on the peninsular shore of the Golfo Dulce. There is no report from the intervening Térraba region.

Every locality mentioned above has mangrove habitat, with the possible exception of Pozo Azul de Pirrís which is situated close to mangroves. Moreover, the species seems to have been taken only in the same surroundings in coastal Panama. Personally, I met this cotinga at the estuary of the Río Palo Seco and at Rincón de Osa, where I saw it usually in groups to the size of small flocks, almost invariably in tall trees and typically in the mangroves and contiguous tall woodland.

Occasionally I saw a single individual a fraction of a mile away at a woodland border. In the mangroves individuals are almost constantly flying about and may be seen actively fluttering up and down between the higher and lower branches. The bird flies easily and well, either in the direct, flowing manner of a pigeon or in long and shallow, tityra-like dips. The note is a dovelike or trogon-like "cah" or "cow," ending in a throaty scrape. When repeated several times, it forms a not unmusical call reminiscent of that of *nitidus*. The birds call seldom.

The Caribbean *nitidus* and the Pacific *antoniae* have been treated as separate species or as geographic races of the same species, depending on the viewpoint of the cataloguer. Though very similar in plumage, they differ conspicuously in the color of the beak, which is blue-gray in both sexes of *nitidus*, yellow in *antoniae*. This marked morphological difference in otherwise all-white birds could, I believe, serve as a visual barrier against potential interbreeding. Ecologically the coastal, mangrove habitat and behaviorally the more sustained activity of *antoniae* indicate a different sort of bird from *nitidus*.

***Attila spadiceus* (Gmelin)**

POLYMORPHIC ATTILA

RANGE: Western Mexico to Bolivia and southeastern Brazil.

***Attila spadiceus citreopyga* (Bonaparte)**

RANGE: Nicaragua to western Panama.

The Polymorphic, or Bright-rumped, Attila is distributed over the entire country, including the dry-forested Pacific northwest, from sea level to the lower montane belt. Most abundant at the lower elevations, it occupies a variety of arboreal habitats, deep in tall virgin forest, along woodland breaks such as ridges and valleys, in shaded second growth and tall thickets, in trees both large and small in plantations and similar situations. It even frequents mossy, overgrown stumps in clearings, and it also occurs not uncommonly in mangroves. In woodland it keeps well up in the trees; elsewhere, at almost any height from the ground. It is a solitary, probably sedentary bird. Seldom does one find two individuals foraging together.

The attila resembles a large, streaked fly-

catcher, partly because of its straight, hooked beak, which, incidentally, appears set at a slightly upturned angle. It also brings to mind a puffbird, such as *Malacoptila*, in its streaked under parts, sturdy body, relatively short and shapelessly narrow tail, in its tail-jerking habit while sitting erect, and in its suddenly about-facing. Becard-like in its foraging, the attila leaps from branch to branch, pauses at each stopping place to look alertly about for prey, then makes short sallies. It gathers tree-borne berries in sudden snatches, not while hovering. It takes good-sized prey, and I have seen it beating a large frog against a branch, as does the flycatcher *Megarhynchus*. When attracted by army ants, it dashes and flutters about like *Gymnopithys*.

Two of its several calls are unique in Costa Rica. One, in its most common form, is a deliberately exclaimed rather than sung, downward spiraling "weétit weétit weétit weéit weeee," followed in some individuals by an unexpected hiccup. The second call, a reversed counterpart of the first, is an upward-spiraled "quitit quitit quitit quitit queeur," accented on either syllable. Heard frequently for long periods almost everywhere, they are very difficult to trace, because the calling bird perches close to the trunk in the protection of the foliage. Other cries include a woodpecker-like laugh or rattle; an arresting "chítarut" similar to that of the Squirrel Cuckoo (*Piaya cayana*); a harder "tiddleditdit" of the sort given by the Piratic Flycatcher (*Legatus leucophaeus*).

***Laniocera rufescens* (Sclater)**

SPECKLED MOURNER

RANGE: Southern Mexico to northwestern Ecuador.

***Laniocera rufescens rufescens* (Sclater)**

RANGE: Southern Mexico to northwestern Colombia.

The Speckled Mourner "is common in eastern Panama, but is one of the rarest Central American birds" (Griscom, 1932, p. 278). It is certainly scarce in Costa Rica. The nine known localities are scattered over the Caribbean slope (one exception: Pozo Azul de Pirrís) in the tropical and subtropical belts, where I suspect the bird prefers the foothills

to the flat lowlands. It is an arboreal species which, in my experience, inhabits the lower strata of humid forest between 10 and 30 feet from the ground.

In the Sarapiquí lowlands I met repeatedly what were surely the same individuals singly, sometimes in separated two's, at the same places at a wooded swamp and near a shaded forest stream in broken terrain. I was able to rediscover these sedentary, sluggish birds, because they were loath to leave the small trees in the favorite sites from which they were calling for long periods. As this was probably the breeding season, I did not find them at those places during the rest of the year, when they were presumably silent. Occasionally, however, I did see a single bird temporarily in the company of a mixed bird party, whether of the sort attracted by legionary ants or one which troops higher through the trees. In contrast to its companions, *Laniocera* was as inactive as, for example, a trogon. Yet, in the excited manner of *Lipaugus unirufus*, which was also present, it would stand horizontally on a branch for a while and swivel from side to side. Apart from its prevailing coloration, so similar to that of *Lipaugus unirufus* and *Rhytipterna holerythra*, its steeper forehead gives *Laniocera* a dovelike look. Its yellow wing tufts are normally not conspicuous.

The bird stretches its neck and opens its bill very wide to utter its iterated, minor-keyed "peétiyeet." Sounding a little sad despite the fairly brisk delivery, it reminds me of the sprightlier three-note call of its semi-terrestrial neighbor, the wren *Henicorhina leucosticta*. Sometimes the first note is prolonged as is that of another neighbor, the manakin *Schiffornis turdinus*. Vocally the bird bears a slight resemblance to *Rhytipterna holerythra*, none to *Lipaugus unirufus*.

Rhytipterna holerythra (Sclater and Salvin)

RUFIOUS MOURNER

RANGE: Southern Mexico to northwestern Ecuador.

Rhytipterna holerythra holerythra
(Sclater and Salvin)

RANGE: Southern Mexico to Colombia.

The species is distributed throughout the humid-forested Caribbean and southern Pa-

cific slopes from sea level to at least 4500 feet. It is common along the Guanacaste Cordillera; though not recorded from the Cordillera de Tilarán, it should be present there, too. There is a lone record from the Tropical Dry Forest, none from the entire region of the central plateau. Despite the over-all occurrence of the bird in the humid tropical belt, I suspect its breeding range lies at upper tropical and lower subtropical elevations in the foothills.

This mourner occurs sparsely in forest, mostly high in the trees. It is much more common in open or cutover woodland, intermediate-stage second growth with remaining big trees, and well-shaded clearings and plantations beside tall woodland; here it usually keeps from several yards to middle heights, sometimes higher, in the trees. Almost always seen singly, it is occasionally met in small groups of adults and fledged young, rarely in what appear to be mated pairs. The bird is sluggish in the sense that it perches quietly, then forages suddenly by darting, flitting, or hovering.

This shy bird utters infrequently its diagnostic, two-note, minor-keyed call so similar to a sailor's or "wolf" whistle in melancholy vein. Sometimes the bird works up to it with a few successively rising whistles; at other times it adds a middle note. It also gives a sad "weep," much like that of the flycatcher *Myiarchus tuberculifer*. Young birds utter short gentle whistles suggestive of the two-note call.

Lipaugus unirufus Sclater

RUFIOUS PIHA

RANGE: Southern Mexico to northwestern Ecuador.

Lipaugus unirufus clarus (Ridgway)

RANGE: Nicaragua to northwestern Colombia.

The Rufous Piha inhabits the Caribbean slope and the southwest, mostly at low elevations. On the Caribbean side it is not known above the tropical belt or upon the northwestern divide. In the General-Térraba-Golfo Dulce sector it is still locally abundant at 3000 feet and fairly common to approximately 4500 feet. A "rain"-forest species found from the top of the understory to above

medium heights in the trees, it visits the adjacent well-shaded semi-open daily. It is seen alone, in two's, and in three's; a number of individuals may occupy the same site. Its self-advertising behavior makes it apparently, as it is no doubt actually, far more abundant than *Rhytipterna* in their extensive areas of sympatry.

This is a lively, noisy, variably behaved bird that often appears animated even when at rest. Thus, perched horizontally in an inquiring pose, the piha swings its head from side to side while holding its wings below the level of its tail, raised and lowered like that of a trogon. Its throat feathers are often partially erected, perhaps as a sign of high excitement. Standing on a branch, this cotinga may bring to mind a cinnamon-colored robin in general appearance, proportions, and attentive posture; sitting quietly, slowly turning its head, suddenly fluttering to another perch, a trogon. Usually it flies with an audible flutter and alights rather heavily. It forages by fly-catching off leaves and darting for grubs or berries which it snatches on the wing.

Its sprightly voice is completely different from that of the retiring *Rhytipterna* of confusingly similar appearance. The typical call is a sudden, very loud and arresting "wee-weéoo weeooweét," often shortened to an equally alerting "weeooweét," instantly recognizable in the forest. The bird makes several other distinctive cries that remind me of the cuckoo *Piaya*, the woodpecker *Dryocopus*, and some of the *Xiphorhynchus* woodhewers.

***Pachyramphus versicolor* (Hartlaub)**

VARIEGATED BECARD

RANGE: Costa Rica to Bolivia and western Venezuela.

***Pachyramphus versicolor costaricensis* Bangs**

RANGE: Costa Rica and western Panama.

The Variegated Becard is known in Costa Rica only from the cool and wet central highlands, including the Dota region. It almost surely occurs southward along the Talamanca Cordillera to Panama and, possibly, northward on the northwestern divide. Vertically it ranges from the upper portion of the subtropical belt to the lower limits of the montane belt. Here it inhabits the chilly misty

mountain forests and frequents the tree-scattered openings. It is met locally and uncommonly, most often in pairs, also singly and in three's, from fairly low to high in the trees. I have also seen it dash into low shrubbery in the semi-open and alight on brush.

Its small size, short stout body, relatively large head, and style of coloration bring a manakin to mind, but its movements are not so light-bodied as those of a manakin, and it perches less "solidly." Its foraging flits at fronds and leaves are like those of a small stubby flycatcher or a manakin; at times it heightens its activity to a vireo-like searching in branches and foliage. This little becard is certainly more active than its Costa Rican congeners, which are all larger in size, relatively sluggish, and not so noisy.

The spirited call bears a resemblance not to that of any native cotinga but to that, for example, of the antbird *Gymnopithys leucaspis*. It consists of a rapid series of insistent "pee" 's, neither strong nor weak. Also given is a somewhat similar, soft even "spinking."

***Pachyramphus cinnamomeus* Lawrence**

CINNAMON BECARD

RANGE: Southern Mexico to western Ecuador and western Venezuela.

Pachyramphus cinnamomeus fulvidior

Griscom

RANGE: Southern Mexico to Caribbean Costa Rica and adjacent Panama.

Pachyramphus cinnamomeus cinnamomeus

Lawrence

RANGE: Pacific Costa Rica to western Ecuador.

The Cinnamon Becard in Costa Rica is primarily a Caribbean species, represented by the Central American *fulvidior*, which inhabits mostly the tropical belt and ranges to the lower subtropical belt on the foothills and slopes of the central highlands. It is apparently scarce along the northwestern divide, as I found it there at but one locality, which overlooks Lake Arenal. On the Pacific side, where it is known only from a few widely separated sites (the head of the Gulf of Nicoya, Pigres, and the peninsular coast of the Golfo Dulce), occurs the race *cinnamomeus*,

here at its northern limit and apparently confined to mangroves and their immediate vicinity. I found it common only in the mangroves at the head of the Golfo Dulce, extremely rare or lacking elsewhere.

The bird on the Caribbean side is a common to abundant, apparently sedentary, resident in plantations with shade trees, abandoned clearings, and similar habitat in generally wooded areas. Keeping mostly from shrub to medium heights in the trees, it is seen alone or in two's, also in small groups of several scattered, loosely colonial individuals. It occurs infrequently inside forest, usually hidden in the upper strata, possibly as an uncommon resident but more likely a visitor from neighboring semi-open tracts. It is absent from suitable habitat in deforested areas. A record from San José, if not erroneous, is extraordinary.

In appearance and proportions, mostly because of its somewhat oversized head, often a bit shaggy or weakly crested, and in its actions, alternately bursts of activity, such as fly-catching off leaves, and quiet intervals when it looks about, the bird is becard-like. Upon alighting, it bows its head or stretches and nods, sometimes through an arc of 90 degrees, in the manner of *Myiarchus* flycatchers and *Elaenia flavogaster*. The gentleness of its voice contrasts with the inquisitiveness of the alert nodding.

Its usual calls are a wistful, slow-paced, thinly musical "wee-tee-tee-tee-too" and a forlornly descending series of minor "pee" 's. Less distinctive variants and combinations of these calls are scratchy or unmusical, speeded or retarded, or simply abridged. The bird also utters for lengthy periods a succession of thin squeaks. The Pacific *cinnamomeus* makes, in addition, a stopped-up, icterid-like, trilled whistle which I have not heard from the Caribbean form.

***Pachyramphus polychopterus* (Vieillot)**

WHITE-WINGED BECARD

RANGE: Guatemala to Bolivia and northern Argentina.

***Pachyramphus polychopterus cinereiventris*
Sclater**

RANGE: Guatemala to northern Colombia. The White-winged Becard is the most

widely and evenly distributed member of its genus in the country. It occurs primarily in the tropical belt along both slopes, in the dry (from the lower Tempisque basin southward) as well as the humid life zones, and rises uncommonly into the lower subtropical belt. It inhabits the borders of forest, thinned woodland, advanced second growth, and, especially, semi-open clearings and plantations, but is absent from forest. The more extensively forested the region the less common is the bird.

The species is encountered regularly but nowhere abundantly, alone or less often in pairs, from shrub height to high in tall trees. Moving deliberately among branches and foliated twigs, hopping from one to the other and plucking food at the end of a fluttering leap, it seems to prefer the larger insects—so, at any rate, it would appear to the observer. (The coloration of the female brings to mind a flycatcher.) Its usual call, lacking the wistfulness of the related one of *cinnamomeus*, could be taken for that of a trogon. Given by both sexes, it is an iterated series of "chü" 's, weakly patterned at the beginning. The bird makes several other sounds.

***Pachyramphus albogriseus* Sclater**

BLACK-AND-WHITE BECARD

RANGE: Western Nicaragua to Peru and Venezuela.

***Pachyramphus albogriseus ornatus* Cherrie**

RANGE: Western Nicaragua to northern Colombia.

The Black-and-white Becard in Costa Rica is rare and local but apparently widely dispersed. Its poorly known distribution is seemingly that of a Pacific species which extends eastward upon the central plateau, with slight penetration of the Caribbean slope. It is known, in all, from but six localities spread over the following areas: the eastern edge of the central highlands, San José on the central plateau, the Pacific-facing southwestern slope of Poás Volcano, Bebedero in the subhumid northwestern lowlands, and the far southwest. There is no record from all the lower Caribbean slope.

I saw the bird, only once, in the vicinity of Buenos Aires near the Río Térraba. That individual, a male, was in the company of an

arboreal mixed bird party in tall forest. I know nothing else about it. The similar-plumaged *polychopterus* does not occur in forest nor does it accompany traveling bands.

***Platypsaris aglaiae* (Lafresnaye)**

GRAY BECARD

RANGE: Southwestern United States to Costa Rica.

***Platypsaris aglaiae hypophaeus* Ridgway**

RANGE: Caribbean slope, Honduras to Costa Rica.

***Platypsaris aglaiae latirostris* (Bonaparte)**

RANGE: Pacific slope, El Salvador to Costa Rica.

The species reaches its southern geographic limit in northern Costa Rica. *Hypophaeus*, of the humid Caribbean slope, is known only from three localities in the wet-forested northeastern sector: Jiménez, El Hogar, and Puerto Viejo de Sarapiquí. *Latirostris*, of the Pacific slope, is confined to the Tropical Dry Forest that covers the northwestern Pacific lowlands. Not so rare as *hypophaeus*, it is least uncommon in the basin of the Río Tempisque and is also known from each side of the Gulf of Nicoya.

Carriker (1910, p. 665) implied that *hypophaeus*, living under the same conditions as the Cinnamon Becard (*Pachyrhamphus cinnamomeus*), is an inhabitant of heavy forest. I consider *hypophaeus*, just as I do the Cinnamon Becard, a nonforest bird that occurs in second growth with openings and plantation type of country in which shade trees are mixed with thickets and shrubbery, in forested regions. Possibly *hypophaeus* is not even a Costa Rican resident but a straggler from the north. The bird (or birds) seen by me in the Sarapiquí lowlands looked lost, so to speak, and appeared to be seeking the company of a loose group of the very similar-plumaged Cinnamon Becard, by which it was several times rebuffed.

Latirostris lives in a very different environment in seasonally arid Guanacaste, where small-leaved woods are scattered through the savanna-like lowlands, partially flooded during the rainy season. Here the bird occurs singly in shrubby trees in very open wood-

land and in the scrubby cattle lands. It has also been recorded from mangroves.

The Gray Becard utters a flycatcher-like sharp twitter and single notes that have an introductory or underlying rasp.

***Tityra semifasciata* (Spix)**

MASKED TITYRA

RANGE: Northern Mexico to Bolivia and southern Brazil.

Tityra semifasciata personata

Jardine and Selby

RANGE: Eastern Mexico to northern Guanacaste, Costa Rica.

***Tityra semifasciata costaricensis* Ridgway**

RANGE: Honduras to Panama.

The Masked Tityra, one of the very common birds of Costa Rica, is widely distributed from sea level to the middle altitudes. Except for the montane and subalpine belts, it inhabits all the life zones in its range and is most abundant at the lower elevations. Strictly arboreal, the principal requirement of this bird seems to be the presence of trees. It is usually seen in groups that troop about high in the trees, but also occurs singly and, in the breeding season, in pairs. It travels to some extent over the canopy but is seen seldom inside forest. I consider it a nonforest species that prefers plantations, cutover areas, thinned woodland, and woodland borders, all with some tall trees. A short-tailed, short-necked, solid-bodied bird, it does not appear at all agile as it flits at foliage for prey or small fruits, plucks its food in a frantic hover, or hops along branches. Often it sits lackadaisically erect and still for a while. Its shallowly dipping flight, usually direct, suggests a deficient maneuverability. Its characteristic cry is a piglike guttural "guzzít."

***Erator inquisitor* (Lichtenstein)**

BLACK-CAPPED TITYRA

RANGE: Southern Mexico to Bolivia and extreme northeastern Argentina.

***Erator inquisitor fraserii* (Kaup)**

RANGE: Southern Mexico to central Panama.

The distribution of the Black-capped Tityra generally parallels that of the Masked Tityra. The Black-capped, however, is missing from the northern two-thirds of the Guanacaste lowlands, largely if not entirely absent from the central plateau, and is apparently unknown above the subtropical belt. In many places, as in the subtropical belt and most of the southwest, it is not nearly so common as the Masked, and it usually occurs in pairs or in groups considerably smaller than those of the Masked. The two species are very much alike in habits and habitats, except the Black-capped tends to keep lower in the trees. They differ little in size and are similar in plumage, but their head markings are as distinctly different in life as in the specimen tray, and their voices are quite different. Also, the Black-capped in flight flashes a white patch on the under side of the wings. The Black-capped utters sawing or "zicking" or "squicking" notes in simple sets of two or three, as well as froglike, wrenlike, or flycatcher-like sounds. During the breeding season I have seen a pair of both of these tityras perched amicably beside their respective nesting holes in the same forked stub. Both species, as do some of the parrots, evidently prefer to nest as solitary pairs, away from their own kind, in thinned woods.

I follow Wetmore (1943, p. 284) who, retaining *Erador* instead of merging it with *Tityra*, considered the morphological differences worthy of generic separation. A premature application of the lumping technique would in this instance mask what could be a remarkable case of convergence.

Querula purpurata (Müller)

PURPLE-THROATED FRUIT-CROW

RANGE: Costa Rica to Bolivia and northern Brazil.

The Purple-throated Fruit-crow, in Costa Rica at its northern known limit, is a Caribbean species confined to the tropical belt, most commonly below 1000 feet. Although plentiful in the northeastern sector, the bird is not recorded from nearby Nicaragua despite the continuousness of the coastal-plain forest. This may reflect a predilection to broken portions of the forested lowlands. The species does seem to be most abundant at the juncture of flat country and the first foot-

hills. Possibly its distribution coincides with the occurrence of certain fruits necessary to its diet, but this I am inclined to doubt. A forest-based species, it is found most often along the borders of forest and in adjacent tree-scattered clearings and plantations; here it usually keeps at or below medium heights in the trees. It is met irregularly a little behind the forest border, rarely well inside forest, except perhaps along breaks; here it keeps mostly to the canopy.

This cotinga occurs as a rule in small groups of three to several individuals, also in pairs, hardly ever alone. Normally it travels about as a trio or self-contained larger party that comprises both sexes. The birds are noisy and bold, hence attract the observer's attention. Alternating their fluttering slow flight with sails or festooning in short dips, the short-tailed, broad-winged birds traipse in easy stages from one stopping place to another in the trees. Habitually upon alighting and frequently when calling, they vibrate the tail as though it were wet. They sit exposed to view and look around slowly for lengthy intervals, sometimes slowly crouching as they do so. They pluck fruits and large insects on the wing, in the manner of a trogon. Though its limited powers of flight might make it an easy prey for a raptorial bird, yet I have seen *Querula* make passes at a perched hawk. It is also apt to worry a large toucan.

Vocally the bird is also distinctive. It utters, low in the throat, a sort of cooing "oò-oò oò-oò," a catlike scratchy snarl, ducklike quacking sounds, and, often when taking off from a perch, a dovelike little growl.

Cephalopterus glabricollis Gould

BARE-NECKED UMBRELLABIRD

RANGE: Costa Rica and western Panama.

This exotic bird, "found from sea-level up to 10,000 feet" (Carriker, 1910, p. 661), is essentially a Caribbean species recorded widely from the tropical belt to well up the Cordillera Central. It slightly overlaps the Pacific-facing slope of the Cordillera de Tilarán and, possibly, the Guanacaste Cordillera. Elsewhere it is known only from the mountains of the Dota region. Though not recorded from the Talamanca Cordillera proper, Carriker's (*loc. cit.*) observation of "a pair on the Rio Sicsola, near sea-level" makes

it almost a certainty that the species rises upon the eastern slope of the cordillera.

The umbrellabird, breeding in the wetter parts of the cool subtropical belt, uncommonly higher, and apparently spending the rest of the year in the foothills down to the edge of the coastal plain, performs a biannual vertical migration. During its seasonal movements, it occurs in small groups; in its breeding territory and on the warmer wintering grounds, singly. (See Slud, 1960, p. 58, 102.) It is strictly a forest inhabitant that occurs at all heights from several yards above the ground to the canopy; sometimes it ventures into the tree-scattered semi-open at the forest border. In general, it is encountered haphazardly and locally.

A heavy-bodied, broad-beamed, short-tailed, short-legged bird, it hops along branches like a toucan or, sitting torpidly in open view, turns its head slowly and may lean forward as do other cotingas. For no apparent reason, the resting bird is apt to fly a short distance to another tree where it does the same thing; or, evidently on the alert, it flutters to better concealment in the foliage. Its flight is awkward, noisy as that of a toucan, and the bird alights heavily. Despite its poor flight, the umbrellabird, which is very large for a cotinga, regularly forages on the wing, fluttering and snatching a fruit or large insect from the foliage in the manner of a trogon or puffbird. Also, I have seen it pursue acrobatically a large insect that it had dropped while beating it gently against the perch.

It is a silent bird that attracts attention by reason of its loud flutters. During the course of many encounters coupled with long waits, I never knowingly heard its voice, which is said to be a growl or grunt. I tried out of curiosity to imitate such a sound in the presence of a presumably breeding male. He reacted instantaneously by hopping and peering about in an agitated manner. Unfortunately, he did not respond vocally.

Procnias tricarunculata (J. and E. Verreaux)

THREE-WATTLED BELLBIRD

RANGE: Honduras to western Panama.

The Three-wattled Bellbird performs seasonally the most extensive vertical migration, from sea level to timber line, of any Costa

Rican bird. Breeding from February to July in the chilly fog-drenched cloud forests at the high and middle altitudes, it is best known from the volcanic Cordillera Central. It is also present in the Dota Mountains and almost certainly along the Talamanca Cordillera (although there are no records). It is extraordinarily abundant, at any rate locally and perhaps only seasonally, along the Pacific face of the Cordillera de Tilarán (as at Monteverde, altitude 4500 feet), and I found it farther north at Tenorio and Miravalles volcanoes during the nonbreeding season. These are the only reports from the northwestern divide.

As its reproductive period draws to a close, the species descends to lower elevations. Though I found it still plentiful in August at the base of the crater on Turrialba Volcano, the bulk of the population probably winters in the lower montane belt and the upper portion of the subtropical belt. Individuals disperse considerably farther down the slopes and show up as wanderers almost anywhere in the country. In two successive years, at the end of July and in August, respectively, I found it in the northeastern lowlands, but only for a day or two; the males were calling constantly. The species has been recorded higher in the tropical belt and closer to the Cordillera Central in the same sector. During the dry season in Guanacaste, I was astonished to find even a single bird (a female) almost at sea level in the lagoon country at the head of the Gulf of Nicoya. In July, on a 4500-foot ridge that fronts the Talamanca Cordillera in the southwest, I heard the bird with increasing frequency as the month was drawing to a close; unquestionably the species inhabits this cordillera continuously into Panama. Also in the southwest, the bird has been recorded during the nonbreeding season in parts of the tropical belt. Personally, I found it common in January in the vicinity of Buenos Aires and in March in the lowlands at the head of the Golfo Dulce. The bird probably begins its leisurely ascent to the breeding grounds by December or January in some places, February in others. Evidently it does not completely leave the lowlands until April.

Spaced well apart like sentinels, the males occupy high perches, often dry branchlets, hidden from below in patches of forest or ex-

posed to view at woodland edges or the tops of semi-isolated trees. From time to time a bird moves to a nearby perch set at a different angle to face another direction. Ordinarily he sits upright with the tips of his wings underneath the stiff tail. The protectively colored females, by comparison, are retiring and hard to see. Now and again a bird flies off to feed amid the foliage of a fruiting tree. Both sexes fly well, usually swiftly in great, hurtling, wing-folded bounds, also in unhurried shorter dips, at treetop height. Either sex alone or a female followed by a male may shoot low across a hillside clearing from one patch of woods to another.

The male is noisy through much of the year, except possibly from September to December. Wary and watchful, commanding a wide view of his surroundings, he spends most of the daylight hours in calling, even at midday. Ridgway (1905, p. 156) described the call aptly: "The note of this bell bird is most singular, sounding like a heavy stroke with a hard mallet on a hollow log of wood, followed immediately by a wonderfully loud, clear and prolonged whistle—both easily heard at a distance of half a mile or more."

The male appears overcome by the impulse to call. He prepares by leaning forward to the horizontal, opens his mouth to a tremendous gape as if to yawn or belch, and his throat thickens as though to retch. After a pause he produces a loud clanging note. This "heavy stroke" is followed by another pause and then, with the mouth still gaping, by the "prolonged whistle" given once or twice, sometimes a third time. The whistle has the metallic zing of a machete striking a glancing blow. The mouth of the bird has remained open for an average of four to five seconds.

I have never seen the wattles contracted, extended, or stiffened. Often the male turns his head with a toss, and they fall over the beak like black worms. He may, when getting ready to call, toss the middle wattle out of the way onto his forehead, though several attempts may be required. Normally the lateral pair dangle limply like a villain's stringy mustachios. The wattles, the lining of the mouth and throat, and the beak are black. Hence, with the mouth wide open, the white head surrounds a cavernous black

rhomboid from which the black wattles zigzag outward.

Perhaps a male was in display when I saw him about-face directly on his perch, flutter a little into the air in order to about-face, or drop to a nearby limb and return immediately to the original perch, about-facing in the meantime. Occasionally I had happened to see a female perched quietly below a calling male. This time one came to his perch. The male, acting as I had not seen before, studiously kept his head turned away and his body at an angle from hers, then turned to face her obliquely when uttering his call. He also fluttered and leaped into the air from one side of her to the other. Nothing further developed, and after a short while the female flew away.

FAMILY PIPRIDAE

Piprites griseiceps Salvin

GRAY-HEADED MANAKIN

RANGE: Guatemala, Nicaragua, and Costa Rica.

This Caribbean species is known in Costa Rica only from the northern half of the country. It is largely restricted to very wet forest in the tropical and lower subtropical belts and slightly overlaps the northwestern divide (at Miravalles). The bird is hard to find by sight alone, but after learning its call I was able to take cognizance of its by no means rare occurrence. In some respects its behavior is unique among the Costa Rican manakins. Thus, I have found it only in the company of antwrens and other insectivorous birds banded together and trooping through the understory or slightly above it in forest and also in adjoining, shaded, vine-tangled secondary woodland. Often the bands work their lively way along streamsides, skirt the borders of wooded swamps, and cross small openings in the heavy growth. In contrast to its bustling companions, the sudden flits alternating with rests of the one or two *Piprites* are those of diminutive flycatchers and small manakins in general.

Its voice, which is unlike that of any other Costa Rican manakin, bears a resemblance, rather, to that of the flycatcher *Aphanotricus capitalis*. The prolonged call is an easily

recognized "wip-pip-pipürürürürr·pprür," with some of the quality of that of an *elaenia* (*E. flavogaster*).

***Pipra coronata* Spix**

VELVETY MANAKIN

RANGE: Costa Rica to western Ecuador, Bolivia, and Brazil.

***Pipra coronata velutina* Berlepsch**

RANGE: Southern Costa Rica and western Panama.

This almost exclusively southwestern species inhabits the humid forests of the tropical and subtropical belts. In the General-Téraba-Golfo Dulce sector it is plentiful to over 3000 feet, locally common at 4000 feet, and still to be met at 4500 feet along the foothills, spurs, and slopes of the Talamanca Cordillera. But northward to its geographical limit at the entrance to the Gulf of Nicoya, it apparently becomes restricted to the tropical belt. In addition, I found this species on the Caribbean slope in the Sixaola region near Panama, where it was not common. It lives primarily in the understory of high forest and shaded second growth, but is surprisingly abundant in the shrubby, bracken-covered "savannas" at subtropical elevations in the Térraba region. It rarely perches more than a few yards above the ground.

Many individuals may be spread about independently in favored locations. The males are markedly solitary, almost always avoiding one another's company and, during much of the year, that of the females. Nevertheless they are curious and not particularly shy. Flitting about and frequently resting, their small size, black color, and sudden stops make them hard to see. The females are rarely seen with the males but may associate with one another. Their curiosity and fearlessness seem to be even greater than those of the males, as they are apt to perch only a few feet away and call tirelessly in front of the observer. I was baffled by another female that fluttered about oddly and then fell flat on the foliage with her wings still spread. Remaining several moments in this position, she resembled a bat.

I noted no specialized courtship behavior, except possibly a sudden about-facing and

wing flicking combined with rapid fluttering leaps to a branch some 12 inches away and back to the original perch. This was performed in one instance by one male in the company of another male, and in another instance by a female-plumaged single individual. During the breeding season the males utter a unique "z·z·z·zreét" and a not dissimilar "ditditditditdit currék," each with distinctive variations. Usually given two or three times in succession, the entire call takes only a second or two.

Both sexes, the year round, frequently give a rattling trill accompanied by a vibrating of the tail, the latter mannerism helping to set this manakin apart from others. The birds make other sounds, among them a snapping or tearing "raspberry," like that of the congeneric *mentalis*, and a buzzy echoing "chunk."

***Pipra mentalis* Sclater**

YELLOW-THIGHED MANAKIN

RANGE: Southern Mexico to western Ecuador.

***Pipra mentalis mentalis* Sclater**

RANGE: Southern Mexico to eastern Costa Rica.

***Pipra mentalis ignifera* Bangs**

RANGE: Southwestern Costa Rica and western Panama.

The Yellow-thighed Manakin is found along both slopes, most abundantly in the tropical belt, in smaller numbers in the lower subtropical belt, and locally somewhat higher. It is absent from the subhumid Pacific northwest, present but apparently rare along the Guanacaste Cordillera. The two races, one entering the country from the north and the other from the south, intergrade in the extreme southeast near Panama. Essentially an inhabitant of the forest understory but occasionally rising higher, the species may occur also in tall second growth and sometimes in trees in the semi-open. The bird is seen singly and in small groups to half a dozen or so individuals. It subsists largely on small berries, and I have observed it regurgitate large seeds.

The males engage in curious antics most of the year. In one display a male stands diago-

nally on a branch, his body stiffly inclined downward at a 45-degree angle and his straightened legs encased in long yellow "drawers." Thus postured he hitches himself along the branch sideways with his tail end leading the way, just like the moving carriage of a typewriter, synchronized with lightning wing flicks and accompanied by an appropriate clacking. Sometimes he is joined by a female who assumes the same stance at an opposite diagonal facing away from his. The birds approach each other until their rear ends almost touch, then sidle in unison to the left or right. I have heard the bird spoken of affectionately as "el stenógrafo" in reference to this performance. In another display the male flies off some 20 yards to another perch, then "volplanes" back while uttering a long, rocket-like "pseeeee" that terminates in a coarse tearing sound as he lights near the female. Another male may be heard doing the same thing a little distance away.

In addition to other displays the male makes a number of noises, including a ripping "raspberry" and clicking sounds hardly distinguishable from those of the flycatcher *Lophotriccus*. He can purposefully produce sharp or weak snaps with his wings, because he can make the same movements silently. Female-plumaged young males, which can be identified by their white irides and yellowish thighs, may display in the same ways and produce the same sorts of sounds, both vocal and mechanical.

***Pipra pipra* Linnaeus**

WHITE-CROWNED MANAKIN

RANGE: Costa Rica to Peru and southeastern Brazil.

***Pipra pipra anthracina* Ridgway**

RANGE: Costa Rica and western Panama.

The White-crowned Manakin is known from only a few localities on the Caribbean slope of the mountainous central part of the country. The range includes the slopes and ridges east and southeast of Turrialba Volcano, down into the foothills in the upper tropical belt, and the Moravia-Chirripó district on the northeastern approach to the Talamanca Cordillera. Here the bird is fairly common locally at elevations between 3000 and 4000 feet, mostly in the very humid por-

tions of the cool subtropical belt. The distribution is probably continuous along this cordillera to Panama.

This manakin is restricted to the understory in heavy woodland, where it is usually seen singly. It is one of the flitting manakins that typically sally for small fruits, then come to a sudden stop on a perch. The only note I know is a slow, deliberate, unmistakable "squitchsh." During my few encounters with this species I did not observe its display. (That of a conspecies in British Guiana has been described by Snow, 1961, pp. 110-111.)

***Chiroxiphia linearis* (Bonaparte)**

LONG-TAILED MANAKIN

RANGE: Southern Mexico to Costa Rica.

***Chiroxiphia linearis fastuosa* (Lesson)**

RANGE: El Salvador to Costa Rica.

The Long-tailed Manakin ranges over the entire northwestern Pacific quadrant from sea level to at least 5500 feet in the mountains. It is a common inhabitant of the Tropical Dry Forest from which it spreads slightly southward into the Tropical Moist Forest. A female specimen from Paso Real in the Térraba region, if correctly labeled, is the only bird ever found in the southwest. From the subhumid northwestern lowlands it ranges abundantly into the cool and humid subtropical belt along the adjacent continental divide. Its numbers diminish toward the central plateau and on the slopes that rise from it, and it becomes rare on the Caribbean side, where it is recorded eastward to Juan Viñas. It also occurs southward into the Dota region.

The bird generally keeps fairly low in both the dry and humid life zones, where it inhabits dense thickety and bushy growth. It also occurs in tangled low vegetation along streams and at the flooded edges of mangroves. It does not penetrate the depths of high forest, but is common along the periphery. Should one bird be seen, others will be found in the vicinity. It perches quietly, except for constantly flicking its wings jerkily. It forages by means of a sudden flit, then resettles itself just as suddenly on a perch.

The species engages in remarkable courtship antics with vocal accompaniment which I believe help support its morphological specific distinctness. In brief, it performs two

kinds of dances in which two males, either adults or immatures, take part in an integrated display. The adult male also has a slow floating flight that brings to prominence the sky-blue plumage of his back, fluffed to cover most of the upper parts. Certain sounds are made only when the birds display. Several different cries are given at other times. The best known is the "toledo" call which, when it sounds echoing, is uttered in unison by two males perched about 8 inches apart on the same branch or vine. I never heard this species produce mechanical sounds.

***Chiroxiphia lanceolata* (Wagler)**

LANCE-TAILED MANAKIN

RANGE: Extreme southwestern Costa Rica to northern Colombia and Venezuela.

The first Costa Rican report of this manakin was inadvertently that of William Beebe (1942), who called it the "long-tailed manakin" (p. 264) but later identified it as *Chiroxiphia lanceolata* (p. 297). He observed it close to sea level near Golfito in the extreme southwest near Panama. I found it between 4000 and 4500 feet in the region of Cañas Gordas, also known as the Zeledón Hump, which juts into Chiriquí Province, Panama. There I collected the first Costa Rican specimen, an adult male, on March 5, 1962. So far as known, therefore, the species barely enters southwestern Costa Rica from Panama, and it evidently ranges in very humid forest from the coastal lowlands well into the subtropical belt. It was a common bird at Cañas Gordas. In the Golfo Dulce lowlands, however, I did not find it during a six-week period in 1951, either at Piedras Blancas and Esquinas, a little northwestward from Golfito, or at Coto, closer to the Panamanian border than Golfito, nor on the portion of the Osa Peninsula I visited in 1962.

Beebe observed the bird in forest. I found it mostly in forest, also in contiguous subforest and scrub, where it kept well up in the trees and only occasionally descended to eye level. It occurred in local concentrations, its voice arising from all sides in some places, while in others I neither saw nor heard it. Even at the favorable sites I did not actually see more than one bird at a time, although several were in the vicinity. Moreover, I saw only males, all adults except for a

single immature. Twitching its shoulders and flicking its hindquarters, the perched bird acted as does its long-tailed congener, *linearis*.

Its "toledo," sounding to my ears more like "pericor," differs significantly from that of *linearis*. Whereas the latter species pauses momentarily after the first note, distinctly accents the second, and produces a clear short-syllable "toe-laydo," the present species does not pause after the first syllable, and it prolongs the final syllable into a trough-shaped inquiring "dor" or "cor." A single note, transliterated "dough" by Beebe and "dor" by me; a musical "pip," a "püp," like that of *Trogon collaris*, and a two-note "peeüp"; and a frequently uttered, even, musical gargle, "chooyooyooyoo," and so on, of some 10 syllables or vibrations, are sounds that are absent from the repertory of *linearis*. The only cry common to both species is a cat-like "myaaa." The courtship antics and the associated sounds described for *lanceolata* by Beebe (op. cit., pp. 264-266) are quite different from those of *linearis* (Slud, 1957b).

***Corapipo altera* Hellmayr**

WHITE-GORGETED MANAKIN

RANGE: Southeastern Honduras to northwestern Colombia.

***Corapipo altera altera* Hellmayr**

RANGE: Same as that of the species, excluding *heteroleuca*.

***Corapipo altera heteroleuca* Hellmayr**

RANGE: Pacific slope of southern Costa Rica and adjacent Panama.

This subtropical species is most abundant between 3000 and 4000 feet the length of both slopes, and it descends seasonally into the foothills as far as the edge of the humid coastal lowlands. It inhabits the forest understory between 5 and 10 feet up, but also goes lower and occasionally higher. Usually it is met singly. Sometimes a few individuals of the same sex occur together, but the two sexes seldom mingle. Where markedly abundant, as along the Pacific side of the Talamanca Cordillera, loose parties of females accompanied by a few males regularly visit thinned edges in search of small fruits fairly high in the trees.

During the breeding season a number of males, adult and immature, congregate in the undergrowth surrounding a smooth mossy log exposed in a clear space, usually very small, on the forest floor. To begin, one bird flies to the log with a peculiarly retarded flutter, as though he were treading air while suspended from an alternately stretching and contracting spring. Hovering, he hangs vertically, with the feathers on the under parts fluffed markedly in the immature, hardly if at all in the adult. Settling on the log as gently as a ball of cotton, either silently or with a strong "tsee," he immediately hops or flutters sideways with an ejaculated "ruck," and he may follow this with another hop. So quickly is the "tsee" succeeded by the "ruck" that they sound like a single two-syllable cry. A mechanical buzzy snap, like that of a snapping manakin (*Manacus*) or of *Pipra mentalis*, preceding the "tsee ruck" helps produce a triple sound. The bird now gazes inquiringly about and up. If an immature, his fluffy body is round and stout, and his white throat, softly puffed, almost engulfs his bill. If an adult, his black body is not obviously inflated, but his stiffly projecting white throat feathers make of the gorget a cutthroat-shaped, starched frill or bib. In the southwestern *heteroleuca*, the frill is nearly parted at the chin, from which it widens on each side almost to encircle the hind neck, leaving only a narrow black line down the nape.

Soon a second individual of the several perched about like spectators bounces slowly through the air to the mossy platform. Crying "tsee," he may or may not stop on the log. If he does not stop, the first bird remains on stage. If he does stop, he gives the "ruck," and the first bird departs immediately. Only one male at a time occupies the log in signal obedience to the rules of the game. A female may appear unobtrusively upon the green-swarded little arena, but she neither disports nor displays. Also, from time to time, two males chase each other silently through the forest with the agility and speed of humming-birds.

Apart from the antics, the usual note is an unclear "sree" or "sreeir" given by either sex with the bill often wide open. Sometimes it is unrecognizably harsh, or begins harshly be-

fore rising in pitch, or it may have a rippling quality.

***Manacus aurantiacus* (Salvin)**

SALVIN'S MANAKIN

RANGE: Pacific slope of southern Costa Rica and western Panama.

Salvin's Manakin, the Pacific representative of its genus in Costa Rica, is confined to the humid-forested southwest, southward from the entrance to the Gulf of Nicoya to Panama. It is most abundant in the tropical belt, especially in the General-Térraba region, but apparently diminishes in numbers in the very wet Golfo Dulce lowlands as well as toward its vertical limit at about 4000 feet in the subtropical belt. Occurring both in scrubby- and high-forested areas, its habitat is impenetrable thickets and other sorts of dense low new growth a little inside woodland and along its borders. It keeps low, usually not much above eye level, but occasionally rises to the lower branches of a tree. Generally a number of individuals are scattered about singly or in two's or three's in suitable surroundings. The habitat and habits are very much like those of *candei*.

This species seems to be inferior vocally to *candei*. Like the latter, it utters a snorting "chirr" and a longer, rippling snort. The mechanical tearing sounds common to both species are accompanied in this one by a bee-like hum or buzz which I have not heard from *candei*. Whereas the male *aurantiacus* may fly with a grasshopper-like wing ticking, the male *candei* produces a somewhat different, ruffling noise.

***Manacus candei* (Parzudaki)**

CANDÉ'S MANAKIN

RANGE: Southern Mexico to eastern Costa Rica (and almost certainly adjacent Panama).

Candé's Manakin, a Caribbean species, occurs abundantly over most of the tropical belt, except in the southeast near Panama, where it is uncommon. It rises locally into the lower subtropical belt in the central part of the country and barely reaches the northwestern divide, where I found it only at the Arenal gap. It lives almost exclusively in thickety, tangled second growth alongside or undergrowing the forest border. So marked is

this preference that the species seems to occur colonially, as do, for example, marsh birds of discontinuous habitat. It is found mostly at or below eye level, close to or temporarily on the ground when engaging in courtship antics. It is met singly, in two's or three's, occasionally in slightly larger groups. A lone individual, usually a female, is to be seen from time to time in a semi-isolated tree in the nearby semi-open. A male or two can be found very infrequently outside dense cover.

This manakin makes mechanical snapping, tearing, ripping, and ruffling sounds as well as vocal snorts and sweeter notes. The twig-snapping noises of the bird, often produced in rapid-fire fashion, reveal not only its invisible presence but also the surprising abundance of the species. When alarmed or inquisitive or noisily making his two-foot leaps back and forth in his arena (joined on occasion by the female), the male has his throat puffed and his chin feathers pointing jaggedly downward.

The vocal repertory includes a call note similar to that of *Corapipo*, a two-note call not unlike that of the flycatcher *Terenotriccus*, a finely rippled but hard wrenlike note, a trilling snort, and other cries.

***Schiffornis turdinus* (Wied)**

THRUSHLIKE MANAKIN

RANGE: Southern Mexico to Bolivia and southeastern Brazil.

***Schiffornis turdinus veraepacis*
(Sclater and Salvin)**

RANGE: Southern Mexico to western Panama.

This odd manakin inhabits the humid-forested tropical and subtropical belts up to at least 4000–4500 feet along both slopes. Though absent, as might be expected, from the northwestern Pacific lowlands, surprisingly it is not recorded from the southeast, where it should be present. Otherwise it is widely distributed on the Caribbean slope and is met most often at about the 1000-foot level. In the southwest, where it seems to be more abundant than elsewhere, it occurs commonly both in the lowlands and on the mountain slopes. It is fairly common along the northwestern divide north from Lake Arenal,

but has not been reported from the Cordillera de Tilarán.

It does not leave the forest except for an occasional appearance in bordering advanced second growth. As a rule it keeps to the lower understory, seldom rising 20 feet up. Quite unlike birds so often associated with this habitat, it is not sedentary but roams the forest freely. It is almost always found singly, by sound far more often than by sight. The bird is hard to see mainly because of its dull coloration, so inconspicuous in the heavily shaded undergrowth in which it flits and suddenly perches. Far from being shy, it sometimes exhibits a lethargic curiosity. Unexpectedly an individual may stop upon a low stem, to which it clings sideways like a wren or antbird, close to the observer. It then looks around slowly with exaggerated deliberateness, leaning forward to or even below the horizontal, drawing itself back, then repeating the slow leaning process in a slightly different direction. If not for the brightness of its black eye, the creature might appear to be dozing off. The friendly innocence of this inquiring attitude is remarkably touching and unforgettable.

The unmistakable three-note call is characterized by its prolonged first whistle and made diagnostic by the addition of a strongly accented whistle and a short level one; the variations, too, are mostly recognizable. Other cries include a sweet note in duet, a rattle, a ripple, a stuttering call, and little whines. Vocally the bird reminds me more of a cotinga than a manakin.

FAMILY TYRANNIDAE

***Sayornis nigricans* (Swainson)**

BLACK PHOEBE

RANGE: Western United States to Bolivia and northwestern Argentina.

***Sayornis nigricans amnicola* Bangs**

RANGE: Costa Rica and western Panama.

The center of abundance of the Black Phoebe, a subtropical species, is on the central plateau and the east-central portion of the country (Cartago Province). It rises up the neighboring slopes of the plateau to perhaps 6000 feet and descends the river valleys to 1500 feet or so. It is also present on the north-

ern slope of the Cordillera Central, in the Dota Mountains, the southwest from the General region to Panama, and along the Talamanca Cordillera in the southeast; it is not recorded from the northwestern divide. Though uncommon in the southwest, where it is rare below 2500 feet, I saw a single individual at 1200 feet along the Río Coto Brus.

The usual habitat of the bird along rapid streams and rivers, especially those with boulders and steeply undercut ledges, is favored also by the river flycatcher *Serphopha* and the dipper *Cinclus*. On the cultivated, relatively unbroken central plateau, however, it is found together with other flycatchers that do not inhabit riversides. Below the "meseta," individuals leave the river in order to nest under the roofs of houses situated well above and behind the banks. They can be seen commonly on electric wires and on roofs in the town of Turrialba (beside the Turrialba River).

This phoebe is a typical short-sallying flycatcher. It sits on boulders, often amid turbulent currents, and regularly makes sorties to snap up insects from rocks in its immediate vicinity or just above the surface of the water. Away from rivers it prefers flat surfaces, too, for its hunting operations. It may strike out only a foot or two from a wire, a low branch, or a bush. But more often it descends close to the ground, takes its prey during a hovering flutter, and returns directly to, usually, the same perch. It behaves similarly on the ground and on roofs, where it may pass a good deal of time.

It occurs singly and often in family-sized small groups. If not actually friendly, it is a remarkably tame bird that does not seem to mind close observation; the nervous flicking of its tail is habitual. It is quite vocal, but its several sounds lack variety and musical quality. A variable shrill chirp and a hard metallic "squir" or "squissur" are the ones most frequently given.

***Colonia colonus* (Vieillot)**

LONG-TAILED TYRANT

RANGE: Honduras to Bolivia and extreme northeastern Argentina.

***Colonia colonus leuconotus* (Lafresnaye)**

RANGE: Honduras to western Ecuador.

This Caribbean flycatcher is common in the tropical belt, to which it is nearly confined, and becomes scarce even a little higher in the foothills that front the Cordillera Central. A nonforest species that nests in holes in stubs, it frequents semi-open situations, such as plantations, clearings with scattered trees, woodland edges, and riversides. It generally occurs singly or in two's, though a number of individuals may be spread over a favorable area. It is usually docile and can often be approached closely.

It perches mostly below medium heights down to eye level on shrubs and fronds, on a petiole, at the top of a small tree, or on the tip of a slender stub, but also on lofty foliated or bare branches. The perch selected is usually a temporary favorite. A typical sallying flycatcher, its striking long tail makes the sorties, which range from a foot or two straight up to a lateral sweep of some 25 yards, accompanied by a wing-produced whir or hollow rattle, appear spectacular. The sitting bird jerks its tail from time to time and, especially upon alighting, lifts it high and lowers it more slowly, perhaps several times in succession.

The bird has several kinds of sweet peeping notes, usually given singly but also in repetition. A patterned call, "beep·b·beep beep·beep b·beep," is not unlike that of the jacamar *Galbula ruficauda*. Another call is a doubled rising "wee" followed by a rapid skewy "tzryou." It also utters wiry notes and a sibilant chatter.

***Muscivora forficata* (Gmelin)**

SCISSOR-TAILED FLYCATCHER

RANGE: Breeds in south-central United States; winters from Texas to Panama.

The Scissor-tailed Flycatcher, a visitant from the north that apparently begins to arrive in the latter part of October (Wetmore, 1944, p. 58) and remains at least until early April, is virtually confined to the northwestern Pacific quadrant. An abundant inhabitant of open and semi-open country, it is as typical of dry-forested Guanacaste as the Magpie Jay (*Calocitta*) and, like the latter bird, rises to the transition with the moist subtropical belt along the northwestern divide. It winters less commonly in the Puntarenas-Esparta area, and extends eastward in

steadily declining numbers over the cleared central plateau to beyond the city of San José. In San José a bird or two is occasionally seen perched on electric wires or flying around a church spire in the center of town. It occurs as a rare transient on the southwestern savannas where the congeneric *tyrannus* has its headquarters.

The Scissor-tailed is usually found in small flocks which get larger toward evening as the birds gather to roost, but it is also scattered about individually. The flocking behavior intensifies as the time to migrate north approaches. Especially then do the flocks exhibit to advantage their wildly wind-driven group-held flight. The normal flight, which features swallow-like whipping beats, is modified by the high winds in Guanacaste during the dry season to retarded hoverings, lateral slips, and high-velocity sweeps. The perched bird generally keeps rather low, and it regularly drops for a moment to the ground for prey. Except for an occasional twittering, its usual note is a simple nasal chip, similar to that of *Myiozetetes granadensis* in particular.

***Muscivora tyrannus* (Linnaeus)**

ORK-TAILED FLYCATCHER

RANGE: Southern Mexico through South America east of the Andes to central Argentina; southern birds migrate to northern South America and Lesser Antilles.

***Muscivora tyrannus monachus* (Hartlaub)**

RANGE: Southern Mexico to Colombia and south-central Brazil.

In my experience the Fork-tailed Flycatcher is resident and common only in the Térraba region, especially around Buenos Aires, where it is the most striking inhabitant of the open savannas. From time to time it is also seen scattered in two's or three's near Cartago and Paraíso on the Caribbean side of the central plateau. Elsewhere it is known from such diverse places as the Pacific slope of the northwestern divide (Miravalles), the Guanacaste lowlands (Bebedero), the Pacific side of the central plateau, and the eastern foothills of the Cordillera Central, in any of which it may breed in suitable cleared areas. An open-country flycatcher like the migrant *forficata*, it does not conflict in range with the

latter. Whereas *forficata* is nearly confined to the northern half of the country west of the continental divide, *tyrannus* is found primarily in the far southwest.

At its center of abundance the Fork-tailed occurs in small flocks or as individuals scattered over the savannas in sight of one another on low trees, bushes, and grass stems. The bird also spends a good deal of time standing quietly and patiently on the ground, where it appears quite out of place. Settling on a perch, the bird spreads its tail lyrelike; perched, it may keep the tail spread when not shearing it characteristically. It usually flies slowly, alternating several swallow-like beats with a glide, but it can dive through the air in wing-folded spurts when performing long scudding sweeps. As the birds flock before roosting in thickets, they are acrobatically spectacular toward the end of the day when they chase one another about, perhaps inside a village, to the accompaniment of excited-sounding twitterings.

The voice is guttural, scratchy or burred, creaking, and dry. None of the notes resembles the chip of the Scissor-tailed, nor is any particularly flycatcher-like. They include a rapidly repeated "djrit" more guttural than that of a swallow, a warbler-like dry "tick" or "tsick," a dry, creaking or scratchy "zik·ik·ik·ik," and so on, almost exactly like the call of the Everglade Kite (*Rostrhamus*), and a rattling fluttery noise when maneuvering or hovering in the air.

***Tyrannus tyrannus* (Linnaeus)**

EASTERN KINGBIRD

RANGE: Breeds in eastern North America; winters chiefly in South America.

The Eastern Kingbird, a regular Costa Rican transient, has its spring migration, extending from April to as late as the third week in May, much better marked than the fall, when it is seen mostly in September. It occurs almost anywhere from the lowlands to the highlands along both slopes, but seems to prefer routes that either follow the coastal strips or skirt the swiftly rising slopes. Though Carriker (1910, p. 688) reported it as a winter visitant, he gave no dates.

The bird travels in units of a few to a flock of several dozen individuals. The flocking behavior is usually more apparent in flight than

when the birds are at rest. In the air their streamlined proportions, two-tone coloration, and series of whipping beats alternating with buoyant glides that often veer from the line of flight are all swallow-like. (Swallows, incidentally, migrate singly or as a broken procession of family-sized waves; a flock of Eastern Kingbirds is usually massed laterally.) The birds crisscross every which way, yet their respective paths gravitate toward the center of the flock. Whether wildly driven or almost stopped by the wind, the flight of these kingbirds again resembles that of swallows or a flock of Scissor-tailed Flycatchers.

The members of a resting flock are generally seen singly or associated loosely; the majority are dispersed out of sight. They sit erect, motionless and silent, usually well up in the trees. Superficially they bear a strong resemblance to a group of Cedar Waxwings (*Bombycilla cedrorum*), and they are just as apt to depart suddenly in swift dipping flight to settle a fair distance away. Occasionally a bird makes a little sally, hardly more than a leap, of perhaps a foot or two straight up from its perch.

Sometimes a good-sized concentration of resting birds is encountered. Such a flock, dawdling for a week or two in the same place, possesses a special character. The birds, wheeling about independently in quarter-flapping short flutters, do a good deal of moving and shifting of position. For the most part this maneuvering is confined to a small radius and is oddly silent, thus bringing to mind the activities of little birds in a soundproof cage. Some individuals set out on short fly-catching sallies; others flutter to pluck berries from leafy branches. One bird may hover above another that is perched, and both may dash off in a spirited chase. A lively brace of possibly paired individuals may flutter about with snapping and whirring sounds. Another may be quarreling with one of the native yellow-bellied flycatchers. Still another may drop to the ground for a few moments, stand short-leggedly erect with the tip of its tail touching the ground, then return to a perch with a flick of its tail and maybe of its wings. Yet these animated outbursts are the exception, the quiet withdrawals the rule.

Vocally, as already mentioned, the birds are mostly silent during their peculiar tarry-

ing migration. Occasionally I heard a typically flycatcher-like harsh note and sometimes a short "beezy" twitter.

***Tyrannus verticalis* Say**

WESTERN KINGBIRD

RANGE: Breeds in western North America; winters chiefly from Mexico to Nicaragua, recorded in Costa Rica.

The only Costa Rican report of the Western Kingbird is that of Austin Smith (1934), who collected one at Villa Quesada (altitude 2100 feet, on the northwestern [= Caribbean] slope of the Cordillera Central). Although I have been unable to locate this specimen, there is little reason to doubt Smith's identification of a bird with which he was unquestionably long familiar. This individual was probably a wanderer from its main wintering range farther north. Unfortunately, Smith did not give the date.

***Tyrannus melancholicus* Vieillot**

TROPICAL KINGBIRD

RANGE: Southern Texas to Bolivia and central Argentina.

***Tyrannus melancholicus chloronotus* Berlepsch**

RANGE: Southern Mexico to Colombia and northern Venezuela.

The Tropical Kingbird is the most common of the larger flycatchers and occurs in semi-open situations almost everywhere from sea level to at least 7000 feet. Its numbers decrease markedly above the central plateau, but it can be seen perched on electric wires all over San José. It is very uncommon in extensively wooded regions and absent from solid forest and absolutely treeless areas.

Strictly insectivorous, it secures winged prey in typical flycatcher fashion by means of short, or occasionally long, fluttering, spread-tailed sallies that are often brilliantly acrobatical, then returns to its original perch, which is usually one of several favorites. Holding the insect in its beak, the bird kills it by beating it against the perch. Sometimes it interrupts the beating to toss the insect into the air, then catches and swallows it whole.

The bird "sets up shop" on the tip of a post (but seldom on dead stubs), on the top of a small or medium-sized tree, upon a bare outer branch, or on wires from which it can

strike out unobstructedly in any direction; except where it is rare, it generally does not perch very high. The sallying type of flight is the usual one. Longer flights are performed either by a series of wing beats interrupted by short sails or by a gliding helped along at intervals by short-arc'd, wavy movements of its wings.

Shyness is a trait this bird does not exhibit (except where it is rare). Perhaps more than any yellow-bellied flycatcher, this species is apt to chase other birds. Its anger knows no bounds at the appearance of a hawk, which the kingbird rises high to meet, pursue, and pester, the hawk meanwhile trying to shake itself free and escape. Yet its disposition is not nearly so irascible as that of the congeneric Eastern Kingbird on its breeding territory in the north.

It is a disagreeably noisy bird with a sharp irritated-sounding voice. The usual call is a bickering twitter accompanied by a flutter of half-opened wings by the bird when perched and often as it hovers before alighting. When given in short series, the twitters are similar to the call of *Todirostrum cinereum*. The bird also makes a typically flycatcher-like "beep" quickly repeated a number of times.

[*Tyrannus dominicensis* (Gmelin)]

GRAY KINGBIRD

RANGE: Coasts of southeastern United States and islands in the Caribbean Sea; winters to northern South America and Panama, recorded in Honduras and Nicaragua.

The nominate race is said to occur during migration in Costa Rica by the American Ornithologists' Union (1957, p. 333). I know of no basis for this statement other than the mere listings by Zeledón in his several check lists. These were evidently not considered valid by Ridgway [1907 (1901-1950), pt. 4], with whom Zeledón was closely associated. Yet the species is to be expected and will no doubt be found to occur sporadically on the Caribbean coast of the country.]

Legatus leucophaeus (Vieillot)

PIRATIC FLYCATCHER

RANGE: Breeds in southern Mexico and Central America; winters in South America to Bolivia and northern Argentina.

Legatus leucophaeus variegatus (Sclater)

RANGE: Breeds in southern Mexico and Guatemala; winters in South America.

Legatus leucophaeus leucophaeus (Vieillot)

RANGE: Breeds in Central America; winters chiefly in South America.

The Piratic Flycatcher is a summer visitor that arrives from South America when the North American migrants start north in the spring and departs southward when the latter return in the fall. The common form in Costa Rica is *leucophaeus*; *variegatus*, which breeds farther north, has been rarely collected, even though it must migrate through the country. The species begins to arrive in February, appears in waves of singing individuals from March to May, and by June is widespread. It leaves in September and seems to be entirely gone by early October, yet a few individuals possibly do remain during the nonbreeding season, when their silence, relative immobility, concealment, and scarcity would make them hard to observe. The species in migration covers the country from both coasts to well above the central plateau. The breeding range extends from the upper portion of the tropical belt, also lower locally, into the subtropical belt on the Caribbean slope and down into the lower tropical belt on the Pacific slope.

This flycatcher is abundant over all the cultivated central part of the country, often close to houses and even in the heart of San José, wherever there are densely foliated trees. It is absent from forest and rare in heavily forested regions. Usually it is invisible in the tops of leafy trees, where it habitually perches in one spot and would seldom be noticed if not for its constantly given call. Occasionally it makes a very short sally for an insect or forages for fruits.

The species is known to expropriate nests built by the oropendola *Zarkhynchus wagleri*, probably also *Gymnostinops montezuma*, as well as the flycatchers *Myiozetetes similis*, *Tolmomyias sulphureus*, and others. What these nests have in common is bulkiness and domed or covered-over construction. The nest of *Tolmomyias* is shaped like a retort, and I have seen *Legatus* enter the tubular entrance on the wing as though to the manner

born. Possibly the Piratic is capable of building a nest, but to prove that such is the case one would have to see the bird actually beginning its own, not merely repairing an old nest or altering a new one.

The distinctive little call is rather musical, hence unlike that of most yellow-bellied flycatchers. It is a simple light-hearted whistle, "weéhee" (or "teéhee" or "peé·ee"), virtually a single note, with the first syllable pitched higher than the second. Often it is followed, perhaps after a short pause, by a little trill, "tiddledeedip." Both the call and the trill are repeated tirelessly all day long during the breeding season, apparently by both sexes. Also given are a conversational "títititir," and so on, and occasionally a sharp "ick·a·ick." Whirring, fluttery sounds are produced by the wings as one bird chases another.

***Myiodynastes luteiventris* Sclater**

SULPHUR-BELLIED FLYCATCHER

RANGE: Breeds from southern Arizona to Costa Rica; winters mostly in western South America.

***Myiodynastes luteiventris vicinior* Cory**

RANGE: Breeds from southern Arizona to western Mexico; winters in western South America south to Bolivia.

***Myiodynastes luteiventris luteiventris* Sclater**

RANGE: Breeds from eastern and southern Mexico to Costa Rica; winters mostly in western South America south to southeastern Peru.

The Sulphur-bellied Flycatcher is a migratory neotropical species that begins to appear commonly at the end of February, then increases in numbers in March, April, and May, when it can be met almost anywhere except very high in the mountains. Most specimens belong to the race *luteiventris*; *vicinior*, though rarely taken, is undoubtedly a common transient. After the first influx a good proportion settle down to nest, mostly not until May. The Costa Rican breeding distribution, still poorly known geographically, is rather confused ecologically. At any rate, the bird occurs commonly in the subtropical belt on the humid Caribbean slope that fronts

the central highlands, from which it rises to perhaps 6000 feet in the lower montane belt but does not descend much below 2000 feet; over all the central plateau; along the Pacific side of the northwestern divide at upper tropical- and subtropical-belt elevations; and, in smaller numbers, the lowlands around the Gulf of Nicoya. It is not known to breed along the slopes of the Talamanca Cordillera; its status in the southwest is largely that of a transient.

From July onward the bird calls less and less and by September and October has nearly disappeared. I noted a definite fall migration only in the northeastern Caribbean lowlands, when the species appeared in groups of a few to a dozen or more southward-bound individuals; these birds undoubtedly summered north of Costa Rica. The species seems to be quite absent from most of the country during the rest of the year, though I met it once in January in the vicinity of Buenos Aires in the southwest.

Its habitat is brokenly wooded country, plantations and parklike areas, and open woodland—the sort of environment favored by many yellow-bellied flycatchers. The bird is rather generalized in its activities, but its habit of nesting in a hole in a tree or in a hollowed crotch seems noteworthy. It can cling to the hole like a woodpecker, with its tail pressed against the tree for support. It feeds its young while grasping the lip with its feet or during a hover in front of the cavity.

The Sulphur-bellied is seen singly or in separated two's, sometimes in three's. Almost strictly arboreal, it rests on leafy branches, dry twigs, and electric wires. Occasionally it sallies for insects and, regularly at times, drops to the ground for prey. In general, it snatches its food from leafy branches while hovering, then flies to a perch, either nearby or distant, before swallowing the berry or grub. Though it may sit quietly for lengthy periods, it is a volatile-tempered bird, often irritable and quarrelsome as are many yellow-bellied flycatchers.

It makes hardly more than a single kind of angry-sounding cry, an arresting "squísser" or "squí·ick" such as is produced by a squegee. It is similar to the note of the congeneric *hemichrysus*. Usually it is given singly, but may be repeated a couple of times and be

preceded by an "uk-uk" or "utut." The bird also utters a sharp "wist wist," often followed by the regular cry.

***Myiodynastes maculatus* (Müller)**

STREAKED FLYCATCHER

RANGE: Southern Mexico to Bolivia and central Argentina.

***Myiodynastes maculatus difficilis* Zimmer**

RANGE: Costa Rica to Colombia and Venezuela.

This is primarily a Pacific species with two centers of abundance. One is the lowlands around the Gulf of Nicoya, from which the bird rises in lessening numbers to the subtropical belt on the neighboring southern portion of the northwestern divide and onto the central plateau. The other is in the southwest: the tropical belt in the Térraba drainage and the subtropical belt up to 4500 feet along the Talamanca Cordillera from the Térraba region to Panama. The species is unquestionably resident in Costa Rica; migrants from the south possibly augment the native population during the breeding season. As to the distinctness of *difficilis*, I follow Zimmer (1937, p. 9) as reluctantly as Blake (1958, p. 536), who found "the characters of this race . . . so finely drawn as to approach the nebulous."

The Streaked Flycatcher is most abundant at low elevations in the dry-forested northwest, where the congeneric Sulphur-bellied is uncommon to rare. It is almost absent from or quite uncommon at the higher elevations along the adjacent Pacific slope of the northwestern divide, where the Sulphur-bellied is common to extraordinarily abundant. In the southwest it is not numerous but is encountered regularly, whereas the Sulphur-bellied is a passage migrant. Both species occur together on the central plateau, where the Sulphur-bellied is probably the more common of the two. The Streaked has also been recorded from at least four Caribbean localities in the northern lowlands and at the edge of the central plateau, where its status seems to be that of an uncommon to rare wanderer.

Its habitat in thinned woods and semi-open country clumped with woodland is similar to that of the Sulphur-bellied; neither species enters heavy forest beyond its borders.

The Streaked, however, prefers regions of a drier type, as in the scrubby northwest, where it is sympatric with but greatly outnumbers the Sulphur-bellied. In the southwest it is found both in scrubby and humid woodland in the absence of the Sulphur-bellied. Usually the Streaked is seen singly a few yards up, uncommonly above 30 feet or so. It is relatively inactive and not shy. It looks about slowly and patiently like a lethargic becard. It sallies little, but from time to time makes short fluttery dashes, not much more than leaps, somewhat awkwardly in the heavy-bodied manner of an antshrike. It thus differs obviously from the Sulphur-bellied, which is, so to speak, a free-living, excitable, impulsive bird.

The nasally resonant note, between "tsick" and "tsuck," heavier than that of the Gray-capped Flycatcher (*Myiozetetes granadensis*), is sometimes hardened to "chuck" (or "chrk"); it is given alone or in repetitive sequence. The bird also makes a sharp "skwit askwít askwít askwíta" as do some woodpeckers and the tityra *Erator inquisitor*. During the breeding season it utters rapidly and repetitiously a twilight song for which I substituted the words "wórk ought to be." None of the above sounds is like those of its congeners.

***Myiodynastes hemichrysus* (Cabanis)**

GOLDEN-BELLIED FLYCATCHER

RANGE: Costa Rica and western Panama.

The locally not uncommon Golden-bellied Flycatcher has been known from the central highlands and the nearby Caribbean foothills and slopes that front the northern sector of the Talamanca Cordillera. I also found it fairly common at Monteverde, well up the Pacific face of the Cordillera de Tilarán. Living in cool, very humid, forested environments from about the middle of the subtropical through the lower montane belts, it also occurs locally in cloud-forested pockets downward into the lower subtropical belt, primarily on the Caribbean side. Though not recorded from the Talamanca Cordillera proper, it will almost surely be found there, too. It is sympatric over much of its range with the summering *luteiventris*.

A forest species in the sense that it occurs only where there is forest, it is found beside rather than inside the forest along the many

sorts of breaks in the mountainous terrain as well as in thinned woodland. It occurs singly, in two's, and also in family-sized groups that seem to roam about from hardly above shrub height to high in the trees. It makes forays at or through the foliage, then returns to sit inactively on a perch. Its dipping flight resembles, for example, that of a tityra.

Often noisy, the unpleasant-sounding voice of the Golden-bellied is similar to that of the congeneric *luteiventris*. The usual note, a squeaky "skweéur," is given singly or in repetition as a patterned call. A similar cry, "sweéik," is like that of the jacamar *Galbula ruficauda*. The bird utters several other squeaky, irritated, or excited-sounding notes, alone or in series, including a woodpecker-like set of squeaks different from that of *maculatus*.

***Megarhynchus pitangua* (Linnaeus)**

BOAT-BILLED FLYCATCHER

RANGE: Mexico to Bolivia and northern Argentina.

***Megarhynchus pitangua mexicanus* (Lafresnaye)**

RANGE: Eastern Mexico to Panama.

The Boat-billed Flycatcher occurs commonly over most of the country from sea level well into the subtropical and, at least in the central highlands, the lower montane belts. Found most abundantly in the vicinity of woodland, whether forest, subforest, wooded patches, or galleried streambanks, it occasionally roams over the canopy of solid forest. It is common on the central plateau wherever there are trees. Usually seen in plantations, tree-scattered clearings and pastures, and at woodland borders, it perches at or below medium heights, sometimes very high in the trees. It is met alone and in two's, also in small groups of apparently no fixed abode that move about animatedly rather high in the trees.

It is an active, high-spirited, often excitedly noisy flycatcher of varied behavior. Generally it does not sally for flying insects, but looks around for invertebrates and vegetable food on the limbs and foliage. It may beat a large insect or small vertebrate against the perch as loudly as a woodpecker raps. Sometimes it perches low beside a body of water and fishes for minnows, as do *Myiozetetes*

granadensis and *Pitangus sulphuratus*. It makes bold passes at hawks, both the large and powerful and the sluggish inoffensive ones. Its flight is robin- or saltator-like. It appears broad-shouldered and relatively short-tailed when at rest.

Its voice has an irate quality. The usual call, a sustained harsh twitter rising slightly but definitively at the end, is effectually a long single note which I have transcribed as "ddditditterr." Another common note, "chrunk," is a "pulley" sort of sound.

***Conopias parva* (Pelzeln)**

WHITE-RINGED FLYCATCHER

RANGE: Costa Rica to northwestern Ecuador and northern Brazil.

***Conopias parva distincta* (Ridgway)**

RANGE: Costa Rica.

The White-ringed Flycatcher, once considered a rarity in Costa Rica, is common to abundant under suitable habitat conditions. Restricted to the lower Caribbean slope, it has a spotty distribution in the humid eastern and wet northeastern lowlands. As a wanderer, it shows up in two's and three's slightly above the tropical belt on the eastern approach to Turrialba Volcano. The species evidently prefers semi-open areas of plantation type beside woodland. Sometimes it visits the canopy of tall forest in company with traveling bands of the grosbeak *Caryothraustes poliogaster*. I found it common at forest borders in the northeastern lowlands, where the similar-plumaged *Myiozetetes similis* is uncommon or scarce. On the other hand, it is uncommon in open agricultural portions of the eastern lowlands where *M. similis* is very common.

In the lowlands it is usually seen in somewhat separated two's, also singly and in three's. The members of a pair often occur on different trees, either the crown of a medium-sized one or the outer foliage of a taller tree. Usually it hunts in the foliage; sometimes it sallies for insects. A species that nests in holes high in tall stubs, it can cling to smooth vertical limbs free of bark. The bird is active, ebullient, and noisy. Under stress it sometimes shows its concealed crown patch as a yellow streak.

Its usual call is completely different from

that of *Myiozetetes similis*. In fact, it could be mistaken at first for that of another neighbor, *Megarhynchus*. Sounding like "eeyer dttrrrr," it combines the "squeegie" call of *Myiodynastes luteiventris* in the first portion with a rattling trill, like that of *Contopus cinereus*, in the second portion. Among its several variations, it may be given only in part or with an added note at the beginning or end. The bird also repeats patterned sets of squeaks and makes a rapid sort of "spinking."

***Myiozetetes similis* (Spix)**

SOCIAL FLYCATCHER

RANGE: Northern Mexico to Bolivia and extreme northeastern Argentina.

***Myiozetetes similis texensis* (Giraud)**

RANGE: Eastern and southern Mexico to Costa Rica (and probably adjacent northwestern Panama).

***Myiozetetes similis colombianus*
Cabanis and Heine**

RANGE: Southwestern Costa Rica to Colombia and Venezuela.

The Social, or Vermilion-crowned, Flycatcher inhabits most of the country from the lowlands along both coasts, including those in the Pacific northwest, across the "meseta" and, in decreasing numbers, well into the lower montane belt in the central highlands and perhaps elsewhere, too. One of the most common Costa Rican birds, it is abundant in most semi-open situations, especially areas under cultivation. It enters a bit into second-growth woodland, but is absent from forest. It definitely falls off in numbers, even in apparently suitable habitat, in extensively forested regions. I found it one of the common inhabitants of mangroves at the Golfo Dulce.

An active excitable bird that flies about with noisy animation, it does not regularly make fly-catching sallies from an exposed perch, but forages more frequently for berries and soft-bodied invertebrates amid branches and foliage. Usually it keeps at medium heights, or lower, in the trees; sometimes it drops to the ground for prey. Usually a number of individuals share the same site, but where uncommon it is seen more often singly.

The southwestern *colombianus*, apparently

at its northern limit in the General-Térraba-Golfo Dulce sector, is vocally distinct from *texensis*. The call of *colombianus* is an undistinguished series of squeaky "tcher" 's (or "pseeir" 's or "tseeoo" 's) given on the same level instead of alternately up and down as in *texensis*. Its characterless call note is squeakier than that of *texensis* and more like that of *Myiodynastes luteiventris*. The easily recognized call of *texensis* is an arresting excited-sounding patterned "cheé cheecheé cheecheé cheecheé," its call note is an often identifiable shrill squeak, and its sharp "chit," similar to that of *Todirostrum cinereum*, is given repetitively rather than in patterned series.

***Myiozetetes granadensis* Lawrence**

GRAY-CAPPED FLYCATCHER

RANGE: Extreme southeastern Honduras to Bolivia and western Brazil.

***Myiozetetes granadensis granadensis* Lawrence**

RANGE: Extreme southeastern Honduras to Panama.

The Gray-capped Flycatcher is distributed throughout the humid tropical and lower subtropical belts on both slopes. Seldom have I met it higher in the subtropical belt, yet the species has been reported, rarely, from the lower montane belt in the central highlands; it is scarce or lacking on the central plateau. Wherever it occurs, the congeneric *similis* is also usually present, and both may be abundant in the same places. It seems to be quite absent, however, from the Tropical Dry Forest, where *similis* is common. In very humid, heavily forested regions, as in the northeastern lowlands, on the other hand, it is abundant whereas *similis* is uncommon. Also, *similis* ranges commonly to considerably higher elevations than the present species.

Like *similis*, it is a bird of the semi-open that inhabits plantations, clearings, cultivated land with trees, and streamsides. I found it in tall mangroves, but not in woodland. It often perches rather low, but it also rises well up in the trees. It occurs singly as well as in groups. The groups consist of temporary concentrations of lively noisy individuals which apparently have gathered socially to engage in a particular activity, such as fly-catching or fishing, either of which the loud-fluttering birds do easily and well.

This flycatcher also takes berries, as does *similis*, and probably other plant food.

The two-note angry cry reminds me of the "kiskadee" of *Pitangus sulphuratus*, with the last syllable omitted. The usual note is a somewhat fowl-like nasal "chip" (or "chup"), given alone or in repetition, which the listener soon learns to recognize. During the breeding season it utters in the early morning a burred call which I wrote down as "chip butter beer." Also given are an irregular reedy chatter and an irritated "raow raow," and so on. Vocally this species bears no resemblance to *similis*.

***Pitangus sulphuratus* (Linnaeus)**

KISKADEE FLYCATCHER

RANGE: Southern Texas to Bolivia and central Argentina.

***Pitangus sulphuratus guatemalensis* (Lafresnaye)**

RANGE: Southern Mexico to western Panama.

Except for the far southwest, this noisy species occurs over most of the republic from both coasts upward in diminishing numbers into the lower subtropical belt, including the central plateau. On the Pacific side it ranges from the Tropical Dry Forest southward into the Tropical Moist Forest, so far as known, only to Punta Dominical, where I found it common; yet it is not known in the General-Térraba-Golfo Dulce sector. A species of the semi-open, it is absent from woodland and very uncommon in suitable habitat in extensively forested regions, differing markedly in the latter respect from the superficially similar *Megarhynchus*, which prefers wooded surroundings. It is not uncommon in open situations with few trees. In fact, it is abundant in the open Río Frío region. I have no ecological explanation for its absence from the far southwest.

The Kiskadee is an active, noisy, seemingly irascible bird of varied habits. It fly-catches, investigates foliage, takes small fruits, and, as might be expected from a bird of its size, secures larger prey, such as small lizards. It also profits from the activities of passing swarms of legionary ants. Usually it perches from medium heights down to the tops of shrubs. But in regions where it is uncommon, it generally keeps much higher in the trees, as does

Tyrannus melancholicus under the same circumstances. Unlike *Megarhynchus*, it seems neither to travel about nor to occur in companies. Indeed, two neighboring individuals are apt to react aggressively toward one another, calling excitedly and expanding bushily their normally concealed bright crown patches.

The typical peremptory cry consists of three grating notes: "kisk·adeé." Often the "kisk" is omitted, and this results in a rasping, two-note, jaylike (*Cyanocitta*) call very similar to that of *Myiozetetes granadensis*. The bird also gives a level, single-note, jaylike cry which may be followed by an echoing after-note, indrawn as on a harmonica, as well as a parrot-like croodling note.

***Myiarchus crinitus* (Linnaeus)**

GREAT CRESTED FLYCATCHER

RANGE: Breeds in eastern North America; winters from southern Florida and eastern Mexico to Colombia.

***Myiarchus crinitus boreus* Bangs**

RANGE: Breeds in eastern North America; winters from eastern and southern Mexico to Colombia.

***Myiarchus crinitus crinitus* (Linnaeus)**

RANGE: Breeds in southeastern United States; winters chiefly from El Salvador to Colombia, sparingly in southern Florida, Bahamas, and Cuba.

This migratory *Myiarchus* is a fairly common to locally very common visitant along both slopes. Its broad ecological range includes the dry-forested and humid-forested tropical belt as well as the lower subtropical belt in the central part of the country, along the Pacific slope of the northwestern divide, and upon the Talamanca Cordillera (near Panama). *Boreus* seems to be the common wintering race; *crinitus* is rare in collections. The large size of the beak, which is the distinguishing mark of nominate *crinitus*, can often be matched among breeding samples of *boreus*. Hence *crinitus* may be more common than supposed, because only extraordinarily large-billed specimens taken here on the wintering grounds can be identified with reasonable certainty. Both forms have been

taken at the same place (Las Mesas, January, 1904).

The species begins to arrive in the latter part of September and disappears in April and early May. On the lower Caribbean slope, in my experience, it is seen and heard most often during the first part of its stay (October to January). In general, it is encountered infrequently on the Caribbean side, where it usually keeps hidden high in the trees in virgin forest, but also occurs lower along the forest border, in second growth, and in tree-scattered clearings and plantations. It is more abundant on the Pacific side, especially in Guanacaste and the Térraba-Golfo Dulce region. Here, as a rule, it perches rather low, sometimes close to the ground, particularly in scrubby woodland and in open places. I also found it in tall mangroves together with *ferox*, which keeps closer to the ground. It is quite solitary.

Its varied habits include true fly-catching, though not from a fixed perch, and plucking of prey from leaves during a short flutter. Upon alighting, the bird may nod its head in the lizard-like manner of its congener, *tuberculifer*. Its usual cry, "wheep," or a slightly rising "whirp," may be repeated many times at two-second intervals. Also given are a "wick" (or "pick") and a "pick·a·rick."

***Myiarchus cinerascens* (Lawrence)**

ASH-THROATED FLYCATCHER

RANGE: Breeds in western United States and Mexico, including Baja California; winters southward to southern Central America.

***Myiarchus cinerascens cinerascens* (Lawrence)**

RANGE: Breeds in western United States and Mexico; winters south to Guatemala and El Salvador, recorded in Nicaragua and Costa Rica.

The species is known in Costa Rica from a single specimen of the nominate race. Now M.C. No. 13686 of the Moore Collection, it was collected March 9, 1934, by Austin Smith at an altitude of 800 feet in the Caribbean foothills (the San Carlos region) that front the northern slope of the Cordillera Central. Smith (1934) specified the collecting locality as the Río San Rafael, near Quebrada Azul, 10 miles north of Villa Quesada (situated at a considerably higher elevation) and stated he

observed two more individuals the following day. Present in the same locality were the congeneric native *tuberculifer* and the migrant *crinitus*. Judging by the occurrence of this species elsewhere in Central America, one would normally expect it to wander to the drier Pacific side of northern Costa Rica instead of the humid Caribbean slope, although the open Río Frío region could serve as a port of entry.

***Myiarchus nuttingi* Ridgway**

NUTTING'S FLYCATCHER

RANGE: Western Mexico to Costa Rica.

***Myiarchus nuttingi nuttingi* Ridgway**

RANGE: Southern Mexico to Costa Rica.

Nutting's Flycatcher, confined to the northern half of the Pacific side of the country, is distributed through the Tropical Dry Forest and rises upon the neighboring north-western divide to 4000 feet in the wet subtropical belt. Thus it occurs in scrubby ranch country and patches of open woodland in the subhumid lowlands as well as at the margins of humid woodland at higher elevations. It is sympatric with but much less common than the larger, superficially very similar *tyrannulus* in the tropical belt, where the habitats of the two species hardly seem to differ. However, I have seen *nuttingi* in fairly closed patches of leafy woods from which *tyrannulus* seems to be absent. The living birds can best be distinguished by voice.

Nutting's is met singly and, during the breeding season, in two's, three's, and four's, but is common nowhere. Its rather generalized habits include fly-catching, moving about among branches, and flitting and hovering at foliage, usually fairly low in the trees. It utters commonly two sorts of sounds. One is a not unmusical, flycatcher-like twitter accented at the beginning. The other I have transcribed as "irkurr" or "squeérir" or "rírr·rírr," followed by a woodpecker-like "laugh" of *Myiarchus* quality; this call is diagnostic. Also given is a sort of rolling "tchrrít." I have not heard from this species either the "wheep" of other *Myiarchus* flycatchers or "squirry" sounds.

Recently Lanyon (1961, p. 444) stated that the presence of the race *M. n. flavidior* in Costa Rica was confirmed by two breeding

birds collected in Guanacaste. Subsequently Lanyon informed me that only in these two out of a total of 33 Costa Rican specimens examined, only the rectrix pattern was closer to, though not typical of, *flavidior*. None of the other 31 specimens, including those taken closer to Nicaragua, showed any influence of *flavidior* genes, according to his refined criteria. Moreover, these two questionable specimens were taken in the heart of the range of *M. n. nuttingi*, one of them just a few miles from the type locality, and both of them 140 miles away from the nearest documented occurrence of *flavidior*, at Managua, Nicaragua. In my opinion, therefore, the presence of *flavidior* in Costa Rica is not confirmed.

***Myiarchus tyrannulus* (Müller)**

BROWN-CRESTED FLYCATCHER

RANGE: Southwestern United States to Costa Rica; Lesser Antilles; northern and eastern South America to northern Argentina.

***Myiarchus tyrannulus brachyurus* Ridgway**

RANGE: Southern Mexico to Costa Rica.

The Costa Rican range of *M. tyrannulus* is approximately the same as that of *nuttingi*. Both species are confined to the Pacific northwest, and their habitats apparently differ little in the dry-forested lowlands. *Tyrannulus*, which is not uncommon on both sides of the Gulf of Nicoya, becomes very common to abundant northward from and including the Tempisque region to the lower slopes of the northwestern divide, reaching, perhaps locally, the lower subtropical belt. It is an inhabitant largely of open and semi-open country of the sort in which a flycatcher such as *Tyrannus melancholicus* might be expected. Usually it is met singly, though a number of birds may be scattered over a favorable area. I have seen many molting individuals still keeping together in postbreeding pairs at the end of May and beginning of June.

The bird makes short sallies up into the air and flutters and flits for insects and small fruits on the sprigs and branches among which it moves about. It puffs its throat and nods its head in the lizard-like manner of the congeneric *tuberculifer*. Like *tuberculifer* and *nuttingi*, this bushy-crowned species constantly looks about. In flight, its tail appears almost as reddish as that of *Myiodynastes*

luteiventris. Among its many sounds are a variable *crinitus*-like, noisy and harsh "weerp" and a more musical "tchreep," an iterated rough "wit" something like that of *Capsiempis flaveola*, an "aak tirrit," with the first syllable harsh and throaty like that of its neighbor, the jay *Calocitta*, a "rrick" followed by short police-whistle-like trills with the vocal quality of a flycatcher, a twitter similar to that of *tuberculifer*, a distinctive "wheé tiriririr," and some others.

***Myiarchus ferox* (Gmelin)**

SHORT-CRESTED FLYCATCHER

RANGE: Costa Rica to Bolivia and northern Argentina.

***Myiarchus ferox actiosus* Ridgway**

RANGE: Northwestern Costa Rica.

***Myiarchus ferox panamensis* Lawrence**

RANGE: Southwestern Costa Rica to Colombia and northwestern Venezuela.

The so-called Short-crested Flycatcher, which is at its northernmost geographic limit in Costa Rica, is known there only from the Pacific mangroves. The endemic northwestern race, *actiosus*, ranges from the shores of the Gulf of Nicoya southward at least as far as the mangrove-lined estuaries in the vicinity of Parrita, midway down the coast. The Panamanian-northwest South American *panamensis* is confined to the southwest, where it had previously been recorded only from Puerto Jiménez on the gulf coast of the Osa Peninsula (Sassi, 1939, p. 183). I found it at nearby Rincón de Osa at the head of the Golfo Dulce. A January specimen of this race (A.M.N.H. No. 391037) taken on the Nicoya Peninsula, well within the range of *actiosus*, was probably a wandering individual. The two races can be distinguished in the hand without difficulty.

Apart from its confinement to a special habitat, the generalized activities of the species do not seem to differ from those of other *Myiarchus* flycatchers. Though lacking the reddish brown in wings and tail of its congeners, it exhibits a similar elania-like leaning forward of its body and lizard-like noddings of its head. Usually it keeps fairly low in the vegetation, sometimes within a few

inches of or actually on the ground, but also well up, say, in a bare-branched tree. It flutters, often loudly, amid the mangroves, spiny palms, and shrubbery before stopping for an appreciable interval to look around fearlessly while perched close to the observer. It often occurs singly, also in two's and three's. I found it one of the most common mangrove inhabitants at Rincón de Osa. There, in the month of March, the wintering *crinitus* was also present in fair numbers but not the native *tuberculifer*, which was common in the area just outside the mangroves.

The usual vocalization is a two-note nasal chirrup similar to the cries of *Capsiempis flaveola* and *Camptostoma obsoletum*. A longer, more excited-sounding utterance reminded me of the cotinga *Attila spadiceus*, which was present in the same habitat.

Myiarchus tuberculifer (d'Orbigny
and Lafresnaye)

DUSKY-CAPPED FLYCATCHER

RANGE: Southwestern United States to Bolivia and northwestern Argentina; Jamaica.

Myiarchus tuberculifer littoralis Zimmer

RANGE: Western Nicaragua and northwestern Costa Rica.

Myiarchus tuberculifer nigricapillus Cabanis

RANGE: Southeastern Nicaragua to western Panama.

The Dusky-capped Flycatcher is common to abundant over most of the country from sea level through most of the subtropical belt, above which its numbers diminish markedly; it is known from the lower montane belt only upon the slopes that overlook the central plateau. Even in the subhumid Pacific northwest it is not uncommon. Its preferred semi-open habitat includes pastures and agricultural lands with trees, plantations, parklike areas, and woodland borders. In some areas it slightly penetrates woodland, but it is absent from heavy forest. It is at best uncommon under apparently suitable conditions at the border of extensively forested regions.

Usually frequenting leafy shrubs and trees from fairly low to medium heights, it is seen singly or in separated two's. Sometimes it

makes short fly-catching sallies, in the manner of an *Empidonax*, from a medium-high branch, from a bush, or from brush, but it generally forages inside the foliage, hopping along branches and flitting at leaves. Appearing rather big-headed and often puff-throated, the bird almost invariably exhibits a lizard-like nodding when it alights. I consider its usual cry, a gentle "weeep" (or "wüüü"), often falling slightly at the end, or a "weeéer" that rises as it finishes, distinctive. A chatter, twitter, or ripple may follow this note or be given alone. The bird also makes a sharp short "chick" or "pit" or "chick pwick." A typically flycatcher-like "tirir tirir tiff," and so on, may be given by a small group of apparently excited individuals.

Individuals of the race *M. t. bangsi* Nelson seem to be mostly inseparable from *nigricapillus*. Costa Rican specimens of *littoralis*, described by Zimmer (1953, p. 1), average darker than birds from neighboring Nicaragua, somewhat lighter than *nigricapillus* from the Caribbean slope, and grade into the not quite typical *nigricapillus* of the central plateau region, which in turn merges with the more intensely colored *nigricapillus* of the Caribbean slope and the humid southwest.

Nuttallornis borealis (Swainson)

OLIVE-SIDED FLYCATCHER

RANGE: Breeds in northern North America; winters chiefly in northern and western South America.

This flycatcher is a fairly common passage migrant and, locally, a not uncommon winter visitant. In the fall it begins to arrive by the first week in September, perhaps earlier. The better-marked spring migration seems to be at its peak by the end of April, and the bird can still be seen the third week of May. Probably most individuals pass over the central highlands, even to timber line, and along the Pacific slope of the northwestern divide. The species also migrates in fair numbers along both coasts. While en route a number of birds may loiter for days at a particular site. Wintering individuals apparently occur mostly in the lowlands, to a lesser extent in the subtropical belt, always singly.

The Olive-sided prefers semi-open country with scattered tall trees and stubs, but it may be present in openings, including marshy

places, in heavy woodland. It is strictly a sallying flycatcher that returns to a favorite perch, usually a high exposed one such as the tip of a tall slender stub or a lofty bare twig. Occasionally it takes a lower station; only in the montane belt have I seen it perched at eye level. The sallies, longer than in any other Costa Rican flycatcher, are often so extended that the bird seems to be leaving the vicinity for good. Having caught the insect, it travels all the way back to the same perch.

Though usually silent, the bird may utter an iterated reedy "pip pip pip" like that of *Contopus lugubris* or *Capsiempis flaveola*, but in three-note sets; a formless series of "pip" 's; and a patterned "pip·pip·pip·púrp." It also makes a resonant "tsee" or "tsihh" that may be answered by another individual. Its typical cry, the "quick three beers" of rasping quality and emphatic delivery, I heard, rarely, in the fall (October).

Contopus virens (Linnaeus)

EASTERN WOOD PEWEE

RANGE: Breeds in eastern North America; winters from Nicaragua to Venezuela and Bolivia.

The Eastern Wood Pewee, one of the most common migrants in the spring and fall from sea level to the lower montane belt, sometimes nearly to timber line, is most abundant below approximately 3000 feet. The fall migration is best marked in September, but individuals are already arriving in the latter part of August. In the spring birds can still be met during the first 10 days of May. It occurs in all sorts of semi-open country, including cleared agricultural lands and shaded plantations. As a winter visitant it is distributed uncommonly from the lowlands to the central plateau. It frequents openings in and cuts through forest to a greater extent in the winter than during migration.

Many individuals may populate a site during migration, but each attends to its own affairs. Usually the bird keeps from shrub level to below medium heights in the trees, but it also occurs much higher, sometimes, like *Nuttallornis*, on the tip of a tall thin stub. The perch selected is usually a temporary favorite. Thus stationed, this lively bird continually moves its head in jerky scrutiny of flying insect prey. Strictly a sallying flycatch-

er, its sorties may be rather long and direct or very short. This species and the other migratory wood pewee, *sordidulus*, are the only flycatchers that I have seen exposed and busily at work during a downpour.

Regularly in the spring and fall, sometimes in winter, the bird utters its self-identifying "peeooowéé" (or "pihweéé"). It also gives a coarse little "chip." Occasionally in the fall I noticed it in two's, which, with raised crests and flicking wings, were twisting on their perches and making scratchy sounds of the sort given by baby birds.

Contopus sordidulus Sclater

WESTERN WOOD PEWEE

RANGE: Breeds in western North America from Alaska to western Panama and probably to Colombia; winters from southern Central America to Venezuela and Bolivia.

Contopus sordidulus veliei Coues

RANGE: Breeds in western North America; winters from Panama (possibly Costa Rica) to Bolivia and northwestern Brazil.

[**Contopus sordidulus peninsulae** Brewster

RANGE: Breeds in southern Baja California; apparently transient in Central America, recorded in southern Mexico and southeastern Colombia; not recorded in Costa Rica.]

Contopus sordidulus sordidulus Sclater

RANGE: Breeds from southern Mexico to western Panama; winters to northwestern South America.

The race *veliei*, consisting of migrants from North America, has been recorded only on passage north or south through Costa Rica; there are no indisputable winter records. The race *sordidulus* seems to be composed of residents, for which breeding-season records are scarce (May 26; July 2), and winter visitants. Migrating individuals occur as late as early June in the spring and reappear as early as the third week of July in the fall. These birds, which probably belong to populations that breed farther north in Central America and Mexico, would appear to include Costa Rican transients. Both *veliei* and *sordidulus* are apt to occur almost anywhere at the lower elevations. In the highlands the situation is not clear: *veliei* has been found in the subtropical

belt to at least 4000 feet above sea level, *sordidulus* to timber line. The race *peninsulae*, not recorded from the country, probably does pass through on migration.

The species seems not to differ from *virens* in habitat and behavior. Its call note differs from that of *virens* in being essentially one-syllabled. It can sound like a rather sweet "peeír," "peweér," a level "peeé" or "peeep," or, more typically, a burred "weeér" or a throaty scratchy "prfz."

***Contopus cinereus* (Spix)**

TROPICAL PEWEE

RANGE: Southern Mexico to Bolivia and northwestern and extreme northeastern Argentina.

***Contopus cinereus brachytarsus* (Sclater)**

RANGE: Southern Mexico to western Panama.

***Contopus cinereus rhizophorus*
(Dwight and Griscom)**

RANGE: Northwestern Costa Rica.

The Tropical Pewee is distributed over most of the country. On the Caribbean slope it is fairly common, even abundant, as in the Río Frío region. Occurring in largest numbers in the tropical belt, it also rises unevenly higher to 4000–4500 feet. It is common at lower subtropical elevations on the central plateau region. In the Térraba-Golfo Dulce sector, it seems to be generally uncommon to rare above the tropical belt except locally, as in the Zeledón Hump. It is scarce and local in the northwestern lowlands. There the race *rhizophorus*, endemic to the shores of the Gulf of Nicoya, seems to be largely if not entirely confined to mangroves. Otherwise the habitat of the species lies primarily in the semi-open, including plantations, agricultural lands, pastures with trees, and woodland borders.

The species appears to be relatively most plentiful on the lower Caribbean slope and in the far southwestern lowlands, where the congeneric *sordidulus* is rare. Altitudinally, it tends to be largely replaced by *sordidulus* above the tropical belt. It does not enter woodland, a habitat favored by the wintering *virens* which, however, is too uncommon a visitant to be regarded as a competitor.

This pewee is widely distributed but is abundant nowhere. It occurs in suitable habitat to the very edge of woodland even on the heavily forested lower Caribbean slope, and it generally keeps rather low, from the level of bushes and shrubs to perhaps medium heights in the trees. It is quite solitary when not breeding. Like the migrant pewees it is strictly a sallying flycatcher, but its sallies are seldom long, and the bird shows no marked preference for a favorite perch. A distinguishing trait is the almost invariable shaking of the tail on its return to a perch.

Two kinds of sounds are uttered commonly. One is a slightly musical but unclear short and rapid trill, given emphatically. Though not distinctive, it is not duplicated by similar species of *Contopus* and *Empidonax*. The other is a chirpy "psee" (or "peep"), sharper than the similar note of *virens* and clearer than that of *sordidulus*.

***Contopus lugubris* Lawrence**

DARK PEWEE

RANGE: Costa Rica and western Panama.

The Dark Pewee is an inhabitant of the middle altitudes but is common only in the central highlands, where it is virtually restricted to the Caribbean versant, and in the Dota Mountains. It is present in unknown frequency along the Talamanca Cordillera, where I found it on the slopes of Cerro Chirripó and at Cañas Gordas in the southwest. I also found it, uncommonly, at Monteverde on the Pacific slope of the Cordillera de Tilarán, this being the only report for the northwestern divide. Vertically it ranges from about the middle of the subtropical belt to above 7000 feet, probably to the montane belt. It may descend cloud-forested cool pockets to elevations corresponding to the lower limit of the subtropical belt.

The bird prefers semi-open habitats such as thinned woodland, clearings with trees, and forest openings, but is absent from fields and the interior of forest. Nevertheless it is most common in forested areas. It may be abundant in favored situations, especially in the vicinity of streams, when a number of independent individuals may be stationed relatively close together. Selecting the tip of a tall stub or the topmost branches of a fairly big tree, as does *Nuttallornis*, it generally perches

higher than the other pewees; it also stations itself on low leafy crowns. Strictly a sallying flycatcher that usually returns to the same perch, it functions as does the native king-bird, *Tyrannus melancholicus*, which it seems largely to replace upward from the subtropical belt. At any rate, it is the only abundant, high-perching, long-sallying flycatcher in the middle altitudes.

It sits very straight and flies either in shallow dips, beating its wings at the apices, or in great wing-fluttering dips which frequently change direction. Invariably the bird shakes its tail rapidly upon alighting, as does its low-perching, short-sallying neighbor, the little *Mitrephanes*. When perched low it generally withdraws warily behind a screen of leafy branches higher in the same tree or to one farther removed to avoid being closely watched.

This pewee possesses an assortment of notes and calls. Usually it makes itself known through a short, almost staccato, repetitive, highly variable note: "pup" or "püp," "wew" or "wür," "wit" or "pwick," or "whitit." The level pattern of abrupt notes that alternate with pauses of equal length may bring *Nuttallornis* to mind, but the pewee usually continues to call for long periods. It also makes a sort of "cherp-cherp" that resembles the "cherry cherry" of *Saltator maximus* at a little distance. Sometimes it utters a hoarse seesawing song: "zur zur zur zúr zur zur zur," and so on. Short chases may be accompanied by a grating "rurk a-rurk a-rurk" akin to the "ick a-ick" of a woodpecker.

Contopus ochraceus Sclater and Salvin

OCHRACEOUS PEWEE

RANGE: Costa Rica and western Panama.

I never knowingly saw this rare bird which has been recorded only from Irazú and Turrialba volcanoes. Probably it occurs also upon the neighboring volcanoes Barba and Poás. It should almost surely be present on the Talamanca Cordillera. Carriker (1910, p. 703) had this to say: "This species has thus far been taken only . . . at high altitudes. It is not common, and until very lately was scarcely known except from the type in the British Museum. It inhabits the forest, and has the

habits of the genus, so far as is known." I know of nothing else published on the living bird.

Empidonax flaviventris (Baird and Baird)

YELLOW-BELLIED FLYCATCHER

RANGE: Breeds in North America; winters from Mexico to Panama.

This is easily the most common of the wintering *Empidonax* flycatchers. It arrives by the first week in September, possibly late in August, when it is seen singly, generally in molt and looking soiled and bedraggled. In the spring it can still be met the second and third weeks of May. Its numbers are not noticeably larger during migration than in the winter, perhaps because of its habitat and habits.

The fresh-plumaged wintering bird is distributed over most of the country from both coasts, including the northwestern Pacific lowlands, well into the subtropical belt, including parts of the central plateau. It is probably most abundant in the tropical belt along the Pacific slope, especially in the Térraba-Golfo Dulce region and at the transition from dry to moist forest along the lower slopes of the northwestern divide. It is also met commonly along the lower Caribbean slope. In Guanacaste it inhabits scrubby woodland; every place else it is uncommon inside woods, preferring dense thickety borders and tangled leafy shrubbery mixed with small trees to more open situations. The bird is solitary and generally perches from eye level to shrub height. During migration, however, it occurs to medium heights, or higher, in the trees, and it may rise some 30 feet up in woodland. It moves about silently, as a rule, and often lights on a semi-exposed perch. Rather sedentary, it usually keeps to a particular patch of growth in which it can be rediscovered daily by the observer.

The bird utters many variations on a basic peeping note: a high-pitched sharp "peeer," a rather sweet "peep," a quick musical "pee-eép" (one syllable), a lisping "peéip" or "pseéip," not especially sweet or clear, and a "peep," quavering slightly on the "ee." It also has a squeaky harsh "chip." The perched bird is heard regularly throughout its winter stay.

***Empidonax virescens* (Vieillot)**

ACADIAN FLYCATCHER

RANGE: Breeds in eastern North America; winters from Costa Rica to western Ecuador and northwestern Venezuela.

The Acadian Flycatcher is seen uncommonly in the spring and fall, seldom in the winter. It seems to migrate largely along the Caribbean slope, including overlap onto the Pacific face of the northwestern divide, and it has been reported from the central plateau. The fall arrival begins in the latter part of September and is at its height in October. The spring departure lasts into the second week of May. In winter it seems to be known primarily from the Caribbean slope, mostly in the warm and humid tropical belt. I also recorded it in late February at about 1500 feet near the Coto Brus Valley in the far southwest.

Like *flaviventris* but unlike *minimus* and *traillii*, it generally avoids semi-open situations in favor of thickets, the borders of woodland, and sometimes selectively logged forest. Occasionally it occurs in a densely foliated small tree in a shaded plantation. It is found singly, as a rule within a few yards of the ground. It is harder to see than *flaviventris* because its numbers are small, and it is a more active bird that is not sedentary; than *traillii* and *minimus*, because it is usually concealed by the vegetation. Its lisping note, a short, fairly strong, unclear, often squeaky "psip," "pisp," "peesp," "pseeip," or "peesth," may be given in repetition.

***Empidonax traillii* (Audubon)**

TRAILL'S FLYCATCHER

RANGE: Breeds in North America; winters in Central America and South America to northwestern Argentina.

***Empidonax traillii traillii* (Audubon)**

RANGE: Breeds chiefly in eastern North America; winters from Honduras and El Salvador to Bolivia and Argentina.

***Empidonax traillii brewsteri* Oberholser**

RANGE: Breeds in western North America; winters from Guatemala to Bolivia and western Venezuela.

The races cited above are those accepted by the American Ornithologists' Union (1957), and Costa Rica specimens have so been identified in museums. Judged by the relative numbers of these specimens, *traillii* is more abundant than *brewsteri*. Recently Stein (1958; also oral communication) redefined Traill's Flycatcher as a complex of two very similar species, which would help to explain my inability to identify Costa Rican specimens as to race. In any event, what has been passing as Traill's Flycatcher arrives here by the second half of August but is not seen commonly until it appears in waves in September. These migrating individuals keep from below eye level, making short aerial sorties, to heights of 40 feet or more in the trees, where they flit at the foliage for prey. In the spring, waves of individuals on return migration can still be seen the third week of May.

During migration the bird occurs almost everywhere from sea level to at least 5000 feet in the central highlands. Though preferring the semi-open, it is met occasionally inside forest, generally in the mixed company of other small birds that forage as they travel at medium heights, or higher, through the trees. For the most part, in the winter as well as in migration, it perches on shrubs, small trees, and fallen branches in the semi-open; during migration it may be found in unusually open situations, as on a barbed-wire fence. Unlike the pewees (*Contopus*), the wintering bird keeps low and does not favor a particular perch. Habitually it flicks its wings and tail or twitches its body while resting between short sallies.

Visitants regularly utter an often recognizable "wit" (or "whit," "pit," or "pwik") similar to that of Swainson's Thrush (*Hylocichla ustulata*), also, irregularly, a "psip" (or "fitz") resembling that of the congeneric *virescens*, and a raspy "tsit" or "tsrit." During migration, especially in May, I have heard several calls that appear to correspond to those of different breeding populations in the north: a harsh "witf," an unclear "weewee-wee," a burred or buzzy "pt·reezo," a burred "rích·sirr," a harsh, burred "psyip beeyúr," and a somewhat longer "rwitch rwitch rwitch·beeur." Individuals may chase one

another about while making burred guttural noises.

***Empidonax minimus* (Baird and Baird)**

LEAST FLYCATCHER

RANGE: Breeds in eastern North America; winters from Mexico to Panama.

Very few specimens have been collected of this, the rarest of the migrant *Empidonax* flycatchers. I noted it mostly in the fall, when occasionally a bird uttered its characteristic "chebéc." Apparently it is rare in the spring. Though a small number probably remain for the winter, there seems to be but one definite record, that of a bird I took December 26, 1950, near Santa Cruz in the Nicoya Peninsula. The species occurs in the lowlands of both slopes, in the subtropical belt along the Caribbean side, and on the central plateau. It prefers semi-open situations such as small clearings, parklike areas, and cutover sites in wooded regions. It keeps close to the ground, perching on and flitting amid brush, fallen branches, and low shrubbery. Loitering briefly at a particular site, it acts as a passage migrant. Though generally silent, it sometimes utters a short sharp "wit," "pwit," "wist," "wizt," or "wiss," stronger than the similar note of *traillii*.

***Empidonax flavescens* Lawrence**

YELLOWISH FLYCATCHER

RANGE: Southern Mexico to western Panama.

***Empidonax flavescens flavescens* Lawrence**

RANGE: Costa Rica and adjacent western Panama.

The Yellowish Flycatcher is common in the cool and wet upper half of the subtropical belt and in the lower montane belt, mostly on the Caribbean versant of the central highlands. It rises not uncommonly into the lower portion of the montane belt and in sharply decreasing numbers descends cool pockets down to about 2000 feet. Under similar climatic conditions it is found along the Guanacaste and Tilarán cordilleras and in the Dota Mountains. It is uncommon, if not rare, along the Pacific slope of the Talamanca Cordillera and is yet to be recorded from its Caribbean slope, along which it is undoubtedly present.

This native *Empidonax* occurs in under-

growth and shrubbery within patches of forest, along forest borders, at roadsides and trails in forested country, in brushy clearings surrounded by woodland, but does not enter the grassy highland pastures or well into extensive forest. It is not unusual to see the bird close to the ground in the cutover brushy sites favored, for example, by the wren *Troglodytes musculus*. Generally occurring singly or in separated two's, a number of individuals may be dispersed over a favorable area.

The bird appears fearless, or placid, as it may sit completely exposed on a twig, log, or fence, undisturbed by close observation, quite unlike its congeners (except *atriceps*). It leaps to snatch insects from the under sides of leaves and also seizes prey from the ground. It makes short sallies and at once comes to a frozen stop upon the nearest available perch. Round-bodied, it sits with its wings well separated on each side of the rump, often with the tips of the flight feathers spread finger-like as though forced apart by the stoutness of the body, and from time to time flicks its neatly shaped tail.

Its usual cry is a single note, variable in pronunciation and emphasis. As a long "tseeent" or "seeenk," it bears a striking resemblance to the note of the Wren-Thrush (*Zeledonia*). It can sound like a short strong "psink," "psing," "psin," or "tsin," or a weaker, thinner "tsint" or "tsins." Sometimes a number of short "tsint" 's are run into a series. Occasionally, during hover-flight, the bird makes a rippling twitter.

***Empidonax albigularis* Sclater and Salvin**

WHITE-THROATED FLYCATCHER

RANGE: Mexico to western Panama.

***Empidonax albigularis axillaris* Ridgway**

RANGE: Eastern Mexico to western Panama.

This *Empidonax* has been collected almost exclusively in the general neighborhood of the city of Cartago on the Caribbean side of the central plateau and in the lower part of the lower montane belt on nearby Irazú Volcano. The only other record is that of a bird taken by Underwood in the upper portion of the tropical belt in the southwest (Buenos Aires). I have not knowingly seen this bird in life. I presume it inhabits the same sorts of semi-

open situations as, for example, the migrant *traillii*.

***Empidonax atriceps* Salvin**

BLACK-CAPPED FLYCATCHER

RANGE: Costa Rica and western Panama.

Primarily a high-altitude species common to abundant in the montane belt to above timber line, this native *Empidonax* is known mostly from the central highlands and the Dota Mountains. Though recorded down to the upper portion of the subtropical belt, it is probably a straggler from higher elevations. I met it also on the northern sector of the Talamanca Cordillera. It has not been reported from the remainder of this cordillera, along which the bird undoubtedly continues southward into Panama.

I have seen it in forest-enclosed openings rather than inside forest. It is especially common in the parklike pastures on the high volcanoes of the Cordillera Central. Usually perching on bushes, small trees, and fences, it rises at most some 30 feet from the ground. It is strictly a short-sallying flycatcher that makes its sorties from an exposed perch. Either it returns to this perch or flies off a little way to another temporary station. Alertly looking about for prey, this animated little bird is also tame and confiding. The only sort of note I have heard it give is a fairly strong "pwit" or "pwt" specifically recognizable in the montane belt.

***Mitrephanes phaeocercus* (Sclater)**

TUFTED FLYCATCHER

RANGE: Mexico to northwestern Ecuador and Bolivia.

***Mitrephanes phaeocercus aurantiiventris*
(Lawrence)**

RANGE: Costa Rica and western Panama.

The Tufted Flycatcher inhabits the cool middle altitudes from somewhat below 2000 feet in cloud-forested pockets up to 7000 feet or locally higher. Its center of abundance follows the upper two-thirds of the subtropical belt and the lower half of the lower montane belt; it occurs in greatest numbers probably on the Caribbean versant of the central highlands. It is absent from the deforested central plateau but present on its neighboring slopes and in the Dota region. It was not uncommon

at the two localities in which I found it on the Cordillera de Tilarán, but there is no record from the Guanacaste Cordillera. It is common, perhaps only locally, along the Pacific slope of the Talamanca Cordillera; undoubtedly it occurs on the Caribbean slope, too. A single tropical-belt record on the Pacific side (San Mateo) probably applies to the nearby Aguacate Mountains.

Though it lives in forested regions, this flycatcher is basically not a forest bird. It is a typical inhabitant of woodland openings, brushy clearings, open trailsides and cuts, wherever it finds countless numbers of twigs and stubs on which to perch. It is also apt to occur a little inside a patch of forest. As with many other flycatchers, it is generally found singly, sometimes in two's. In favorable surroundings the spheres of operation of many individuals may overlap considerably, yet each attends to its own affairs.

This lively little bird is a true sallying flycatcher that usually returns to a favorite perch or a nearby one. It makes frequent sorties, sometimes hardly with interruption, for short distances, yet sometimes far enough to suggest a definite departure. The act of alighting is always succeeded by a quick shaking, almost a whipping, of the tail and usually by the bird's calling. It perches on twigs in dry brush, a barbed-wire fence, a short stub, or a low branch; less often it occurs higher, on a leafy branch or a horizontal vine. It sits erect, seemingly at rest, but actually it keeps looking around, about-faces, shakes its tail, and calls. It is always busy doing something. Despite its alertness the bird may permit a close approach before it flies off to a nearby perch, profitably catching an insect on the way.

The call in its usual form is a readily recognized series of "wit" 's, "pee" 's, or "pick" 's, uttered rapidly yet a little too slowly to qualify as a trill. A variant is a bouncing series of "peenk" 's, slowing at the end. The bird also makes the emphatic lisping "pseep" of a flycatcher and squeaky, grating, or irritable cries.

***Terenotriccus erythrurus* (Cabanis)**

RUDDY-TAILED FLYCATCHER

RANGE: Southern Mexico to Bolivia and Brazil.

Terenotriccus erythrurus fulvularis
(Salvin and Godman)

RANGE: Southern Mexico to northwestern Ecuador.

This little species is a common inhabitant of the humid-forested tropical belt along both slopes; it does not enter the dry-forested northwest. On the Caribbean side it is found only occasionally up to 3000 feet; in the far southwest, sparsely to 4000–4500 feet along the Talamanca Cordillera. It has not been reported from the northwestern divide proper.

A forest bird, it also occurs in adjoining, shaded second growth and, very infrequently, in the neighboring tree-scattered semi-open in which, surprisingly, it sometimes nests. Generally it keeps from eye level to the top of the forest understory, occasionally rising 50 feet up, and is seen usually alone, sometimes in separated two's or three's. It often sits in one place for an appreciable interval, rapidly lifting its wings and constantly looking about with its large black eyes. From time to time it flits, whirring audibly or not, for tiny insects and immediately comes to rest on a different perch. It is quite fearless.

Its call is a pleasing "wee·tít," sometimes roughened to "wee·chírz" or weakened to "pee·weé." The first note is at times higher than the second. The bird makes several other sounds.

Aphanotriccus capitalis (Salvin)

SALVIN'S FLYCATCHER

RANGE: Caribbean slope of Nicaragua and Costa Rica.

This uncommon species is known in Costa Rica from nine localities grouped on the wet-forested northeastern and east-central Caribbean slope, from the foothill edge of the lowlands up to 3500 feet in the subtropical belt. Though always found in forested regions, this flycatcher prefers second-growth vegetation, such as overgrown forest borders and thickety riversides and streamsides, usually outside the forest proper. At three localities I did meet it a little inside stands of tall forest. The bird seems to be highly sedentary and is usually seen singly.

In general, Salvin's Flycatcher favors the same sorts of dense growth as does the migrant *Empidonax flaviventris*, and the two

may occur together from eye level to several yards above the ground. Though superficially resembling a myiobius flycatcher, the bird in its actions brings to mind the more active *Empidonax* flycatchers, particularly *flaviventris*, as it moves about in concealment rather slowly, darts or leaps at the foliage for prey, and it calls frequently.

The complete call, sounding like "chōōt chōōt chōōt ch·ch·ch·chtttreéih," the short introductory syllables of which are chipping or clicking, suggests the long utterance of the manakin *Piprites griseiceps*. More often than not, only the "chtttreéih" portion is given. The bird also makes several other cries.

Myiobius barbatus (Gmelin)

SULPHUR-RUMPED MYIOBIUS

RANGE: Southern Mexico to Bolivia and southeastern Brazil.

Myiobius barbatus aureatus Bangs

RANGE: Honduras to western Colombia and Ecuador.

The species is distributed in the humid life zones on both slopes from sea level midway through the subtropical belt; it is absent from the Tropical Dry Forest. On the Caribbean side it rises commonly into the subtropical belt along the Cordillera Central and overlaps the humid Pacific versant of the northwestern divide. In the southwest, though I met it a number of times at or above 4000 feet in the Térraba-Cañas Gordas region, it is generally uncommon above the tropical belt. On both slopes the species is seen more or less regularly, yet is abundant nowhere. I suspect its numbers fluctuate seasonally in the lowlands, especially on the Caribbean side.

A forest inhabitant, it occurs also in shaded second growth, hardly if ever in the semi-open. It may be found together with the congeneric *atricaudus* in scrubby, thickety woodland in parts of the southwest, but its preferred habitat is in the forest understory, above which it rises to medium heights. Occasionally I have seen it high in the trees when in two's or attached to a traveling mixed bird party. Usually it is quite solitary. Flitting about actively in fantailed sweeps, flutters, and U-shaped loops, securing its prey acrobatically in the air, it brings to mind a redstart (*Setophaga* and *Myioborus*).

Perched, it keeps its wings half-opened below the spread tail, again in the lively manner of a redstart.

Its note is an often explosive, sometimes loose, "spit" or "chwit." What may be the song is either a light and musical "chyeww chyeww chyeww," with the notes stretched as they terminate, or a patterned "psee psee psee psee psee." Also given is a rather pleasant-sounding "chírit chírit chírit." I have heard from a pair of birds a hummingbird-like "pt·tweér" or a single wiry "tweer." The species also makes a sort of twanging "tsirr."

Myiobius atricaudus Lawrence

BLACK-TAILED MYIOBIUS

RANGE: Costa Rica to Peru and north-eastern Brazil.

Myiobius atricaudus atricaudus Lawrence

RANGE: Costa Rica to western Colombia.

The Black-tailed Myiobius is a Pacific species found mostly in the southwest. It is present but rare in the dry-forested northwest, whence it has been recorded at only three localities close to sea level in the lower Tempisque basin. In the humid southwest, where it is sympatric with but rather distinct ecologically from *barbatus*, it is fairly common in the tropical belt and rises in reduced numbers to at least 4000 feet. It is present in coastal vegetation near mangroves and in thickety growth and scrubby woods farther inland. Unlike *barbatus*, it is essentially not an inhabitant of tall forest.

Specimens of this species and of the sibling *barbatus* differ principally in the color of the under parts. In life, *atricaudus* differs additionally in the reduced size of its eye ring and in lacking the suggestion of a vertical dusky marking immediately below the eye. Hence it may be worth mentioning that the apparently and perhaps actually smaller-eyed *atricaudus* prefers edges and scrubby second growth, whereas the large-eyed *barbatus* dwells inside heavily shaded woodland.

The two species act alike even when found together. Thus, *atricaudus*, almost always with its tail fanned, flashes its bright rump and forages in the same redstart-like manner as *barbatus*. Their call notes, too, are very similar. That of *atricaudus*, however, usually

impresses me as a weaker, characterless "whit," "pit," "píti," or "tsit," yet it is sometimes strengthened to a slightly explosive "pit." The simple, rather sweet "cheer-cheer-cheer" of *atricaudus* is heard much more frequently than the somewhat different "song" of *barbatus*.

Myiophobus fasciatus (Müller)

BRAN-COLORED FLYCATCHER

RANGE: Costa Rica to Bolivia and northern Argentina.

Myiophobus fasciatus furfurosus

(Thayer and Bangs)

RANGE: Southwestern Costa Rica to central Panama.

This South American species reaches its northernmost limit in southwestern Costa Rica. There it is known from only two areas in the General-Térraba region: the vicinity of San Isidro del General at upper tropical and lower subtropical elevations and around Buenos Aires in the upper tropical belt. My observations on this species are limited to field appearance and type of habitat. The bird frequents "fields" overgrown by shrubbery and low thickety vegetation of the sort in which to expect, for example, the flycatcher *Capsiempsis flaveola*. Flitting among the twigs, the fly-catching habits of the Bran-colored are those of an *Empidonax* in a habitat where *Empidonax* flycatchers are nearly lacking.

Onychorhynchus mexicanus (Sclater)

MEXICAN ROYAL FLYCATCHER

RANGE: Southern Mexico to northern Colombia and northwestern Venezuela.

Onychorhynchus mexicanus mexicanus

(Sclater)

RANGE: Southern Mexico to eastern Panama.

The royal flycatcher is found the length of both slopes but is primarily a Pacific species. It is confined largely to the tropical belt, from which it rises locally and uncommonly to the lower subtropical belt, especially on the Pacific side of the Guanacaste Cordillera. The bird is scarce on the Caribbean side of the country, where I have seen it almost exclusively in humid tall forest; each individual

left me with the impression that it was wandering about. In the Río Frío region, however, it was common in subforest. Much more plentiful on the Pacific side, it is most common in the subhumid northwest, both in scrubby woodland and patches of tall forest and their thickety viny borders. There it seems to be most abundant in the cattle lands at the head of the Gulf of Nicoya and on the partially cleared lower slopes of the northwestern divide up to the transition with the moist subtropical belt. In the southwest I found it only occasionally, mostly in mature forest, ostensibly as a member of an arboreal mixed bird party.

The species is usually met singly, but it also occurs regularly in pairs during the breeding season. Generally it stays in the understory, sometimes it rises slightly higher into the trees, occasionally it drops for a moment to the ground. Foraging on the wing, it dashes about in fly-catching sallies that often resemble those of a redstart. It takes the insect with a snap, sideslips erratically, and, with hanging head and tail, returns flutteringly in indirect circlings to a perch perhaps a good distance away. It is still active toward dusk when other birds that live in shadow have finished their day's work.

The royal flycatcher does not ordinarily erect its crest, which usually lies flat and, together with the long beak, gives the bird a hammerheaded, woodpecker-like look. The folded crest may flash some color as the bird preens, and I have seen it fanned by wounded individuals. Perched, this short-legged bird sits inclined well toward the horizontal. Its wings, like a notched shield, are folded loosely over the relatively long, narrow body, leaving the pale rump exposed. The usual note, a characteristic "keéyirnk," given singly and not often, generally provides the key to the presence of the bird. It also utters a wiry "wreooo."

***Platyrinchus cancrominus* Sclater and Salvin**

MEXICAN SPADEBILL

RANGE: Southern Mexico to northwestern Costa Rica.

The distribution of the Mexican Spadebill, which conforms to that of the Central American arid Pacific avifauna, reaches its southern

geographical and ecological limit in the Pacific northwest of Costa Rica. Here it occurs through the Tropical Dry Forest, primarily in the region at the head of the Gulf of Nicoya, and also slightly beyond, in view of a record from the Río Pirrís (= Río Parrita). It rises commonly on the neighboring slopes of the northwestern divide to the narrow strip of Subtropical Moist Forest, uncommonly higher to perhaps 4000 feet in the Subtropical Wet Forest. There it occurs in sympatry with the very similar *mystaceus* in a narrow zone of overlap which Zimmer (1939, p. 8) considered an area of intermediacy. The bird also occurs at Los Chiles, near the southeastern corner of Lake Nicaragua, and probably along the entire southern shore of the lake, where the habitat is similar in appearance to that in the Tempisque basin.

In the subhumid lowlands, where the dry season lasts nearly half of the year, the bird is found in shaded, edaphically moist woodland, as at swampy places and in gallery forest. It decreases in numbers with increasing elevation, as the environmental conditions approach those favored by *mystaceus*.

***Platyrinchus mystaceus* Vieillot**

WHITE-THROATED SPADEBILL

RANGE: Costa Rica to Bolivia and extreme northeastern Argentina.

***Platyrinchus mystaceus neglectus* (Todd)**

RANGE: Costa Rica to Colombia and northwestern Venezuela.

The White-throated Spadebill is a South American species that reaches its northern geographical limit in the mountains of Costa Rica. Here, along both slopes, the species is nearly restricted to the wet-forested cool subtropical belt, which it barely descends to its lower limits and from which it hardly rises into the lower montane belt. It inhabits the Caribbean versant of the central highlands primarily, the Pacific slope of the Talamanca Cordillera, including the mountains of the Dota region, secondarily. As I found it regularly on the northeastern approaches to the Talamanca Cordillera, I assume that it occurs continuously along the eastern slope to Panama. It has been recorded from the Guana-caste Cordillera, and I found it on the Cor-

dillera de Tilarán (Monteverde). Quite unlike *cancrominus*, it is environmentally confined to very humid, virgin forest and bordering subforest in mountainous country.

Mystaceus and *cancrominus* act similarly. Rather sedentary, they keep to the undergrowth and lower portion of the understory. They move in precipitate dashes, habitually cling sideways to stems, and flit for insect prey. As do other tiny flycatchers, they alternate sitting about with foraging flurries. They are not at all lethargic and are more active than, for example, the congeneric *coronatus*. Both species are almost always found singly. Because of their small size, sudden movements and sudden stops, and the nature of their habitats, they are usually very hard to see. Neither species is nearly so abundant as *coronatus*. They can be distinguished from each other at once by their completely different voices.

Cancrominus has a characteristic nasal or reedy, sometimes "chickling" or rippling little "tídit," "dítarit," "dítitir," or "chítara." The note of *mystaceus* is a short sharp "squick" or "squip," hardly different from the loud, arresting squeak of the leafscraper *Sclerurus guatemalensis*. I cannot compare their "songs" as I have heard only that of *mystaceus*: a sort of trill similar to but more rattling than that of the gnatwren *Ramphocaenus*, not at all musical, and with the final syllable explosive. The calling *mystaceus* not merely exposes the concealed yellow crown patch but spreads it like a fan. It is perhaps significant that the males of *mystaceus*, as contradistinguished by Ridgway [1907 (1901-1950), pt. 4, p. 382], have a large crown patch whereas those of *cancrominus* have a very small one.

***Platyrinchus coronatus* Sclater**

GOLDEN-CROWNED SPADEBILL

RANGE: Honduras to Bolivia and Brazil.

***Platyrinchus coronatus superciliaris* Lawrence**

RANGE: Honduras to northwestern Ecuador.

This little spadebilled flycatcher is distributed over the Caribbean slope and the Pacific southwest, primarily in the tropical belt. On the Caribbean side it seems to be scarce above the 2000-foot mark, the approxi-

mate upper limit of the tropical belt. The belt rises higher on the Pacific side and there, in the southwest, the bird occurs in diminishing numbers, perhaps only locally, up to 3500 feet or more into the subtropical belt. It laps over the Pacific side of the northwestern divide, along which it may mingle with the congeneric *cancrominus* and *mystaceus*, but is absent from the Tropical Dry Forest, where it is replaced by *cancrominus*. Elsewhere in the country it is replaced altitudinally by the higher-ranging *mystaceus*.

The bird is almost never found outside heavy woodland; at best it occasionally enters well-shaded contiguous second growth. It inhabits the lower level of the forest from a few feet to a few yards up in the understory, apparently not higher. It is abundant in favorable localities, where a number of dispersed individuals may dwell in the same small area. Generally it is seen singly or in two's, sometimes in three's, less often as a small, loose group, perhaps a family party. It makes no attempt at concealment and seems little concerned by close observation.

The small size of this flycatcher, its stub-tailed neckless proportions, lightning movements, habit of sitting quietly between bursts of activity, wing flicking, relative fearlessness, and even its call bring to mind the life form of a little manakin. Its flits are often too quick for the eye to follow and afford a measure of protection. The flit is usually two-parted: a short sideways or upward dash aimed at snatching an insect from a leaf, followed without pause by an angled change of direction to a perch. When coming to a dead stop on a branch, but also after calling, the bird features an instantaneous high flicking of its wings. Sitting apparently motionless, the creature is actually highly alert, constantly turning its head about and up and examining the foliage for tiny prey. Oddly, the bird generally dashes off in a direction different from the one in which it was looking last.

Vocally this species is totally unlike its congeners. Its call is simply a sibilant trill, higher pitched and smoother than any similar call heard in the forest. It is delivered either with a gentle rise and fall or with weak undulations. The bird also utters a reedy "chuck-chuck-chuck" that has a fluttery quality.

Tolmomyias sulphurescens* (Spix)*YELLOW-OLIVE FLATBILL**

RANGE: Southern Mexico to Bolivia and northern Argentina.

***Tolmomyias sulphurescens cinereiceps*
(Sclater)**

RANGE: Southern Mexico to Costa Rica (and undoubtedly adjacent western Panama).

This species, the common flatbill of the country, is distributed widely along both slopes, but is apparently absent from the central plateau and the slopes that rise from it. On the Caribbean side it occurs commonly in the tropical belt and in fair numbers through most of the subtropical belt on the slopes of the central highlands, where it has been found in breeding condition at 4500 feet above sea level. But it is more plentiful on the Pacific slope, mostly at low elevations but rising along the northwestern divide and the Talamanca Cordillera to 4000–4500 feet. It is generally common in the subhumid northwest, including the base of the continental divide. There I found it extraordinarily abundant in northern Guanacaste, where at the end of May it was building nests almost everywhere in a year when the onset of the rains was unseasonably late. A number were placed beside wasp nests, as were so many of those of the wren *Campylorhynchus rufinucha*.

This flatbill is essentially an inhabitant of the semi-open and is found in shaded plantations, cultivated areas with trees, at forest borders, in second growth with emergent trees, cutover woodland with openings, and even low shrubbery in stunted, swampy jungle. It does not enter solid forest. On the average it stays at approximately medium heights, but it regularly goes lower and higher. Generally seen singly, several separated individuals may frequent the same site. The bird rather deliberately scans the foliage and moves about among the branches, flitting and leaping at leaves for prey from time to time. It takes small berries and sometimes picks at bare branches as does a tanager, such as *Thraupis virens*. Its only cry, so far as I am aware, is an unimpressive fuzzy "ss-ss-ss-ss," not at all insistent. This sibilant, "saliva-coated" call is one of the frequently heard bird sounds in Costa Rica.

Tolmomyias assimilis* (Pelzeln)*YELLOW-MARGINED FLATBILL**

RANGE: Costa Rica to Bolivia and Brazil.

***Tolmomyias assimilis flavotectus* (Hartert)**

RANGE: Costa Rica to northwestern Ecuador.

The Yellow-margined Flatbill is in effect confined to the tropical belt the length of the country, exclusively on the Caribbean side. Though common to abundant locally, it is rare in Costa Rican collections. I met it several times daily in two well-separated areas: the Sarapiquí lowlands in the northeast and the Sixaola region in the extreme southeast. It appears to be very uncommon, if not rare, in the east-central and northwestern sectors.

In my experience this flatbill is to be found primarily in the very humid, heavily forested foothills where they join the coastal plain, and it shows a marked preference for the tree-scattered semi-open beside forest. It is completely sympatric with its congener, the very similar *sulphurescens*, a widely spread and ecologically far more tolerant species in Costa Rica. It is most abundant, however, where *sulphurescens* is uncommon. Evidently it is restricted and better adapted to a very humid, virgin-forested environment than *sulphurescens*. It also frequents the forest canopy, probably as a visitor from the forest border; *sulphurescens* avoids heavy forest.

The species occurs from below medium heights in the trees, as in a plantation, to very high, especially in forest. It is seen singly as well as in two's or three's and seems to be rather sedentary within a circumscribed portion of the semi-open. Foraging much like *sulphurescens*, it moves about in the foliage, darts at leaves, sallies after prey disturbed into flight, and it also takes small berries. More brightly plumaged and patterned than *sulphurescens*, it is also more active and noisier. Its pert mannerism of holding the tail partly cocked I did not notice in *sulphurescens*.

The calls of the two species are basically similar though widely divergent in quality and style of delivery. *Assimilis* utters frequently an insistent excited succession of

three to five "pss"'s (or "pst"'s or "piss"'s), given more rapidly than the unclear weaker notes of *sulphurescens*. Its several other cries are not distinctive. An acquaintance with the voice of *assimilis* proves it a much more plentiful species than one would otherwise have reason to suppose.

Rhynchocyclus brevirostris (Cabanis)

EYE-RINGED FLATBILL

RANGE: Southern Mexico to northwestern Ecuador.

Rhynchocyclus brevirostris brevirostris
(Cabanis)

RANGE: Southern Mexico to western Panama.

The species is distributed widely but nowhere abundantly in the Caribbean and southwestern parts of the country. It is absent from the deforested central plateau and from all of the Tropical Dry Forest. From sea level it ranges in lessening numbers into the subtropical belt or even to the lower montane belt in the central highlands and the Dota Mountains. It is present but not common at subtropical elevations along the Pacific slope of the northwestern divide.

It occurs primarily in humid forest, secondarily in shaded second growth and along the borders of woodland, seldom in the semi-open. Usually it perches anywhere from close above the forest floor to 20 and 30 feet up. In the forest, however, it is apt to accompany a traveling, mixed bird party, such as dominated (on the Caribbean slope) by the finch *Caryothraustes poliogaster*, very high in the trees. It usually perches quite low in intermediate second growth, including river-side thickets.

This flatbill sits stiffly erect, looking around slowly and deliberately with its bill tilted up and its head drawn a bit back. The effect becomes ludicrous when the bird, stretching its neck, raises its head straight up in order to look around. In fact, the bird always seems to be looking up, never down. Its foraging movements are unexpectedly sudden, like those of tiny woodland flycatchers or almost like those of *Tolmomyias*, both species of which move about the branches and foliage less abruptly. It sallies occasionally, but ordinarily plucks prey from leaves and

twigs at the end of a rapid dart and immediately drops to a perch a few inches away; sometimes it continues onward before coming to a stop with almost invisible suddenness. This seems to be one of the few flycatchers regularly attracted to driving army ants. It may then perch only a foot from the ground and, sitting quietly as usual amid the commotion, look up and about in round-eyed lethargy.

The variable note, a sharp "skwzeep" with a shrieking quality as it finishes, or a quick sibilant "toost" or "whust," harsh or with an interfering burr, lies between the weaker note of *Tolmomyias sulphurescens* and the buzzier one of *Myiopagis viridicata*, species with which it may occur in the same tree. The bird also utters softly, as though singing to itself, a patterned, repeated "weezp-weezp-weezp-weezp" and a weak metallic "wick-wick-wick-wick."

Todirostrum nigriceps Sclater

BLACK-HEADED TODY FLYCATCHER

RANGE: Costa Rica to western Ecuador and western Venezuela.

This diminutive flycatcher is a Caribbean species that ranges from the lowlands into portions of the subtropical belt along the slopes of the Cordillera Central, probably the Talamanca Cordillera, too, and in small numbers spills over locally to the humid Pacific side of the northwestern divide, northward from the Arenal gap. It prefers semi-open sites, such as plantations with shade trees, thinned forest, and woodland edges, usually in well-wooded or virgin-forested areas, but it does not enter forest. Alone or in two's it occupies the stratum extending from the tops of the smaller trees to very high in the taller ones. It is thus separated zonally from the thicket- and shrubbery-dwelling *cinereum*. There is some overlap when it comes down to low trees, not because *cinereum* rises into the taller ones.

The bird is extremely difficult to observe on account of its very small size and its habit of foraging well up in the trees, where it flits in the foliage and comes to dead stops. When the bird departs one tree for another its uncomplicated purpose is simply to explore at leisure a new set of food-providing possibilities. Usually it is identified by voice. Its call

is a series of "chip"'s, each of which is separated from the next by a little space about as short as the "chip" itself. The "chip"'s are not particularly loud and follow one another in slightly descending order while decreasing gradually in speed and intensity. This easily recognized call, simple as it is, advertises the presence of the bird and proves its widespread occurrence. It eliminates from consideration the congeneric *cinereum*, which utters sets of triplets (or quadruplets), and *Myiornis atricapillus*, which sounds like a tree frog. The immature bird utters unpatterned "chip"'s similar to those of a warbler or hummingbird.

Todirostrum cinereum (Linnaeus)

COMMON TODY FLYCATCHER

RANGE: Southern Mexico to Bolivia and eastern Brazil.

Todirostrum cinereum finitimum Bangs

RANGE: Southern Mexico to central Panama.

The Common Tody Flycatcher inhabits most of the country from coast to coast and across the central plateau, but does not rise above the subtropical belt. A common species, it is perhaps most plentiful on the humid Caribbean slope and in the Golfo Dulce lowlands. Though extraordinarily abundant in the savanna-like fields and scrub of the Río Frío region, it is certainly present in its smallest numbers in country of similar aspect in the subhumid Pacific northwest. It does not enter forest anywhere and is quite uncommon even in apparently suitable environments in extensively forested regions. The preferred habitats include semi-open country, forest borders, new second growth, and the margins of shaded streams that flow through cutover areas. It frequents the thickets, bushes, and shrubbery mixed with trees, usually keeping close to or within a few yards of the ground. Where common, as in rural districts, it is not at all shy and dwells beside man in gardens, yards, and the outskirts of villages, although the lack of sufficient cover prohibits entrance into larger towns and cities. It occurs singly and in two's.

The bird makes no special effort to seek concealment, yet may be hard to see among the leaves because of its small size. It seems never to drop to the ground despite its rather long legs, which suggest something other

than a strictly shrubby existence. The bird seldom engages in true fly-catching. Instead it explores the shrubbery and flutters or leaps to snatch an insect from a leaf or twig. Its tiny body has at one end a long flat bill and at the other end a short and narrow, cocked tail which the bird seldom spreads but habitually twitches in a high arc or waggles about, sometimes with a circular motion, as though it were on a swivel and possessed of a life of its own. The bird flies with a twisting motion characteristic of other small, thicket-inhabiting species.

The commonly heard call is quite different from that of its congeners. It consists of a few three-note sets of short "chip"'s run together in "picket-fence" manner; a "chip" may be given alone or inserted between sets. The wren *Thryothorus pleurostictus* utters similar "picket-fence" sounds which are drier, not arranged in equally spaced sets, and consist of more than three notes. The kingbird *Tyrannus melancholicus* may at times utter "chip"'s of the same general type, but they sound more like a twitter and are not delivered in sets.

Todirostrum sylvia (Desmarest)

SLATE-HEADED TODY FLYCATCHER

RANGE: Southern Mexico to Colombia and northeastern Brazil.

Todirostrum sylvia schistaceiceps Sclater

RANGE: Southern Mexico to central Panama.

In Costa Rica this is primarily a Pacific species nearly confined to the tropical belt. It is common both in the Tropical Dry Forest, especially on each side and at the head of the Gulf of Nicoya, and in the humid southwest where, in the General-Térraba region, it rises to the lower limits of the subtropical belt. It is rare and local, for the most part, on the Caribbean side. There it is known from only two localities in the eastern lowlands, one in the Sarapiquí, the other in the Sixaola, region. But in the northwestern sector it is common in the relatively open Río Frío region, which it has entered probably along the south shore of Lake Nicaragua.

Its habitat, which consists principally of thickety growth shaded or not by emergent arboreal vegetation, is denser and more tangled than the shrubbery favored by the

congeneric *cinereum*. The bird is sometimes present in more open undergrowth, coincidentally where the similar *Oncostoma cinereigulare* and *T. cinereum* are uncommon or lacking. Occasionally it enters the thick foliage of a small tree in the nearby semi-open. Keeping a few inches to a few yards from the ground, the bird is usually well concealed. Generally two or three individuals occur rather closely together, but the bird is also met singly. It is sedentary, quite tame, and not especially active. Moving about in an unrushed methodical manner, it hops among the vines and twigs and leaps at leaves, as does *cinereum*. The habitat allows little scope for true fly-catching, and the bird performs little in the way of rapid flutters.

Aside from its sharply pointed beak and different style of foraging, it bears a marked resemblance to *Oncostoma* in both appearance and voice. The two species may occur together in the same thicket, but *Oncostoma* occupies a wider selection of habitats. Both are common on the Pacific side of the country. On the Caribbean side, where *sylvia* is scarce, *Oncostoma* seems not to be reduced in numbers.

Ordinarily the bird utters from time to time a distinctive, short, weak-volumed "tchup" (or "chop" or "chok"). Less often it makes a throaty "rrip" which, when not preceded by one or two "tchup"s, could be confused with the longer note of *Oncostoma*. It also repeats a "peep" much like that of *Tyranniscus vilissimus*.

***Oncostoma cinereigulare* (Sclater)**

BENT-BILLED TYRANT

RANGE: Southern Mexico to central Panama.

The bentbill is primarily a tropical-belt species distributed the length of both slopes. It is fairly common almost everywhere on the Caribbean side, apparently more so below the 1000-foot mark than above it. In the southwest, however, it seems to be more abundant in the upper half of the belt than in the lower. Along the northwestern divide it is seen more often in the moist lower subtropical belt than in the dry-forested lowlands (in which it is rather common).

It lives mostly in low, dense new growth, such as thickets, tangled cover along trails

and cuts, the borders of forest, and the lower understory in open woodland; it is mostly absent from the interior of forest. Hence it is generally encountered at about eye level, rarely more than a few yards up. It occurs singly, though many individuals may share a suitable site, and is highly sedentary. Its voice usually reveals its presence, but this little bird is not glimpsed until it moves; even then it is difficult to locate precisely. Its behavior, to the observer, alternates between periods of sluggishness and impulsive flashes of activity. As with other tiny flycatchers and certain manakins, it appears to be sitting quietly; actually it keeps looking about with a great show of interest. Unexpectedly it makes a flitting dash to snatch an insect from a twig or leaf, then, with scarcely a break in continuity, immediately reseats itself somewhere in the vicinity. The bird is not shy; sometimes it lights beside the observer and then it may even call. This it does by stretching its neck as if to permit unobstructed passage to the dyspeptic note.

This self-identifying note is a prolonged antbird-like but guttural "awwwrp" or "ahrrp," surprising from such a tiny bird. It may also impress as a creaking "ahrrr," "awrrr," or even "kaaaaa," comparable to a gargle or eructation. This cry, which I cannot take seriously, is given singly or repeated at intervals, sometimes persistently, especially at the approach of the observer; it may or may not be preceded by a little "tip." The bird also makes a somewhat descending throaty trill, which, except for its terminating "awp," is reminiscent of that of the flycatcher *Myiarchus tuberculifer*, as well as a guttural "rrip."

***Lophotriccus pileatus* (Tschudi)**

SCALE-CRESTED PYGMY TYRANT

RANGE: Costa Rica to Peru and northwestern Venezuela.

***Lophotriccus pileatus luteiventris* Taczanowski**

RANGE: Costa Rica and Panama.

This pygmy tyrant occurs inland upon the foothills and mountains the length of both slopes at lower middle altitudes. In the region of the central highlands it is found, in good numbers, almost exclusively on the Caribbean versant, but it is also present in the Dota region. It is common to abundant,

too, along the Pacific sides of the northwestern divide and the Talamanca Cordillera (and undoubtedly on their Caribbean sides). It ranges from a low of 1500 feet or so in cool pockets up to 5000 feet at the very least, but its center of abundance follows a rather narrow zone with a mean elevation of 3000 feet.

Primarily a humid-forest species, it lives scattered about singly in the lower understory or immediately above the ground cover; but, when apparently paired, it may rise 30 feet or more in the trees. It also occurs commonly along forest borders, in tangled grassy and scrubby low growth between patches of forest, or even in semi-isolated, thickly foliated small trees in thinned openings. Though its voice is one of the common woodland sounds, the bird is hard to see. Its day-to-day behavior is similar to that of other tiny, darting, woodland flycatchers. Stubbily round-bodied, the inconspicuous bird sits patiently, keenly scanning the neighboring leaves. From time to time it flits a little distance in order to scrutinize a new mass of foliage and perhaps to gain a fresh perspective of the old. It plucks its insect prey while hovering at a leaf and immediately lights on a nearby perch different from the last.

Its voice is sharp and dry, rattling or staccato: a rising and falling dry trill; a sharp, stuttering, "picket-fence" rattle; a quick series of ascending "kwlick"'s staggering to a close; a series of sharp "tchrik"'s either stammering or run together like a rattling traffic whistle. The bird makes several other noises, including a short sharp "djit" or clipping "chit" almost as strong as that of the Squirrel Cuckoo (*Piaya cayana*), a rippling, rattling "tsfrrk," not unlike the little trill of a tree frog, which may arise from all sides of the listener, and the little "pink" of a tree frog. This tiny tyrant, incidentally, has a windpipe of abnormal diameter worthy of a bird several times its size.

***Myiornis atricapillus* (Lawrence)**

BLACK-CAPPED PYGMY TYRANT

RANGE: Costa Rica to northwestern Ecuador.

The Black-capped Pygmy Tyrant, hitherto considered one of the Costa Rican rarities, is confined to the tropical belt along the

Caribbean slope, where it is known from six localities spaced from the northeastern lowlands to "Talamanca" beside Panama. I did not see this minute species until my sixth year in the country. Once acquainted with its voice, I found it quite common if not locally abundant. It is present, apparently, only in heavily forested regions, both inside the forest and near it in the semi-open. Bearing a morphological resemblance to *Todiros-trum*, it is an almost tailless, laxer-plumaged bird that appears to be a forest representative of the latter spatulate-billed genus.

In the forest it keeps from the upper understory to the middle level, but, because of its very small size, it is bound to be hidden by a branch or leaf. Moreover, it has the habit of perching quietly, then foraging in a lightning flit at a leaf or during a hover amid foliage. Outside the forest it occurs in thickety and shrubby growth and overgrown "field" habitat of the sort favored by *Capsiempis flaveola*, for example. It may even perch unconcernedly low in a shrub or small tree or upon the twigs of a fallen branch in open view. It is usually seen singly, sometimes in two's.

It utters commonly two similar sorts of notes sounding more like those of a cricket or tree frog than of a bird. One is a warbler-like "tsrit" (or "strit," "switzt," or "tswitzt"); doubled or repeated a few times, it becomes cricket-like. This note is heard often in the forest, but the listener is apt to disregard it as a non-avian background noise. The bird also makes a buzzy cricket-like note and a high-pitched little buzz.

***Phylloscartes superciliaris* (Sclater and Salvin)**

RUFIOUS-BROWED TYRANNULET

RANGE: Costa Rica to Colombia and northwestern Venezuela; British Guiana.

***Phylloscartes superciliaris superciliaris*
(Sclater and Salvin)**

RANGE: Costa Rica and western Panama.

This tyrannulet seems to have been recorded previously only twice in Costa Rica. I found it uncommon to relatively abundant at an additional six localities. A Caribbean species, it is apparently restricted to the wettest portions of the cool subtropical belt. It is known primarily from the foothills and

slopes of the central highlands, but it also extends northwestward along the continental divide, where, under similar environmental conditions, I found it near the gap occupied by Lake Arenal. The bird seems to be a wanderer along the forested ridges of this hilly belt. The known localities bracket a mean elevation of 3000 feet.

On almost every occasion I met this flycatcher with a mixed band traveling through the trees. I also saw it in tree-scattered clearings nearly enclosed by forest. Behaving as actively as a warbler, such as a redstart, this slight little bird brings to mind a gnatcatcher, too, because of its grayish coloration, short wings, and rather long, narrow tail loosely hinged to the body. It calls often, and its cries are lively and arresting. I transcribed the call as "wiss, wreewreewreewree" and "wree tittittitit" (or "tee," and so on). A single note sounds like "whiss."

***Capsiempis flaveola* (Lichtenstein)**

YELLOW TYRANNULET

RANGE: Nicaragua to Bolivia and extreme northeastern Argentina.

***Capsiempis flaveola semiflava* (Lawrence)**

RANGE: Nicaragua to Panama.

The Yellow Tyrannulet inhabits the humid tropical belt along the Caribbean and southern half of the Pacific slopes; it is absent from the dry-forested northwest. It is generally not common on the Caribbean side, though locally abundant in the Río Frío region, nor is it known there above the middle of the tropical belt. It is more common in the Pacific southwest, where it rises to the lower limits of the subtropical belt, at least in the General-Térraba-Coto Brus region. Though it occurs as a rule in wooded areas, it is definitely not a forest bird. Usually it is found in relatively open sites, such as overgrown clearings and abandoned cultivations, that is, "field" habitat covered with bushes and shrubbery mixed with small trees, where it perches of necessity at or below eye level, as well as second growth 20 to 30 feet tall.

This narrow-billed, active, and noisy flycatcher is usually seen in sedentary two's or in groups of three or four that seem to travel or wander about a suitable area. Behaving rather like a vireo, which it resembles in

style of coloration and markings except for a faint streakiness below, it moves about low in shrubbery and small trees, frequently stops to perch momentarily, flits at leaves, and makes short, almost leaping fly-catching sallies. It flies low in short shallow dips as does a hedgehopping wren or finch. Its repertory is limited but the bird is quite vocal, and individuals keep "talking" to one another. The variable utterance consists of a patterned set of choppy, throaty or harsh elaeenia-like "weep"'s or "pwirp"'s, a nasal, short-note "óyik óyik óyik," or a rapid, repeated "whíchit·wut," with which the tail vibrates in time. The bird makes several other sounds.

***Serpophaga cinerea* (Tschudi)**

TORRENT TYRANNULET

RANGE: Costa Rica to Bolivia and northwestern Venezuela.

***Serpophaga cinerea grisea* Lawrence**

RANGE: Costa Rica and western Panama.

This river flycatcher is distributed in the very humid, temperate, hilly, central and southern parts of the country; it is absent from the northwestern cordilleras. In the central highlands it occurs mostly on the Caribbean versant, where it is apparently most abundant between 3000 and 5000 feet in the Reventazón watershed, and spreads to the mountainous southern border of the central plateau, the Dota Mountains, and the northeastern spurs and foothills of the Talamanca Cordillera. It is present the length of the Talamanca Range on its Pacific slope, almost surely on its Caribbean slope also, to Panama. A species of the subtropical belt, it also occurs somewhat higher into the lower montane belt. It has been found down to about 1000 feet at the northern base of the Cordillera Central, where it may be only a straggler. I saw it rarely even at 2000 feet along the swift and powerful Río Reventazón. Evidently it follows mountain streams downward until the current slackens.

The name "Torrent Tyrannulet" fits the bird perfectly, as it occurs almost exclusively at rapid rivers and streams. Frequenting the boulders as well as the margins and their immediate vicinity, the bird stands on the stones and on the bare or short-grassed banks or perches on the viny growth that covers

the rocky walls rising from the water. It gleans prey from the mossy stones, often at the very edge of the rushing water, or hunts on the banks in running hops. Regularly it makes aerial sorties which, especially when directed over water, are sustained by a steady fluttering also exhibited, for example, by the river-inhabiting warbler *Phaeothlypis fulvicauda*. But crossing a river simply to get to the other side it flies low in sparrow-like spurts. On the banks it flits and changes direction like a redstart, and it may flutter close to the ground.

This small-billed tyrannulet resembles a gray swallow when it stands short-leggedly at rest. Jetting its tail, as do so many river-dwelling land birds, it accents the upstroke. This tail-jerking mannerism is more pronounced than in its habitat-sharing neighbor, the Black Phoebe, and more like that of the warbler *Phaeothlypis*. The bird is seen singly, more often in two's; three or four individuals may be in easy sight of one another at an especially favorable site. Individuals may chase one another about, seemingly in play, perhaps antagonistically. The undistinguished voice is weak, with the "unpleasant" quality of a flycatcher. The bird makes a twitter, a "tseep," a "tsip tsip," a swallow-like "tsirt tsirt," and a series of "tik"s.

***Elaenia flavogaster* (Thunberg)**

YELLOW-BELLIED ELAENIA

RANGE: Southern Mexico to Bolivia and northern Argentina; Lesser Antilles.

Elaenia flavogaster subpagana

Sclater and Salvin

RANGE: Southern Mexico to central Panama.

The Yellow-bellied *Elaenia* inhabits most of the country from the coastal lowlands well into the subtropical belt and reaches probably 8000 feet in the central highlands. On the Caribbean side it is less common in the lowlands than higher in the tropical and in much of the subtropical belts. On the Pacific side it is common in the humid southwest, but does not extend northward beyond the lower Tempisque basin in the Tropical Dry Forest. It is present in good numbers along the northwestern divide, which it either overlaps from the Caribbean slope or follows from the

central highlands. One of the common birds of Costa Rica, it occurs in all sorts of semi-open country, whether wet, dry (except most of northern Guanacaste), hot, or cool. It is not found inside solid woodland nor, it would seem, at extensive coastal marshes. As the Caribbean lowlands become cleared, the numbers of this bird will undoubtedly increase greatly in that part of the country too.

Usually seen singly or in two's, it is a conspicuous inhabitant of rural, parklike, and residential areas and tended plantations; it even dwells inside the city of San José. Frequenting tree and shrub, this flycatcher sallies for insects less often than it forages among branches for small fruits. The bird always gives the impression of high animation to which its excited-sounding voice contributes, and it dashes about quite a bit. On alighting, generally partly screened by foliage, it looks about with spirited jaunty-crested alertness. Perched, its stance, approaching the perpendicular as is so often the case with crested birds, and its relative slenderness help distinguish it from the more horizontally postured *frantzii* and *chiriquensis*. Small-headed and with a columnar, rather long neck, it is unusually proportioned for a flycatcher.

Its usual cry is a hoarse or harshly resonant long "whewwr," sometimes repeated, of distinctive quality not easily forgotten but which I cannot transcribe. It is often followed by a typically flycatcher-like irritated chatter of similar quality. Occasionally the bird makes a "peep" or "weep" not unlike that of *Myiarchus tuberculifer*. It may utter a burred "gledeér" continually in the early morning during the breeding season.

***Elaenia chiriquensis* Lawrence**

LESSER ELAENIA

RANGE: Costa Rica to Bolivia and Brazil.

***Elaenia chiriquensis chiriquensis* Lawrence**

RANGE: Costa Rica to central Panama.

The Lesser *Elaenia* is a Pacific species that occurs almost exclusively in the southwest, where it is confined to the upper tropical and lower subtropical belts up to at least 4500 feet in the General-Térraba-Cañas Gordas sector. At El General it inhabits agricultural and pasture lands, roadsides, scrubby growth, and the edges of open and second-growth

woodland. In the Térraba region its distribution largely coincides with that of the bushy or grassy tree-dotted savannas; it even lives in grass-streeted towns. It is common, for example, above Potrero Grande, where at sub-tropical elevations it inhabits impoverished pastures covered by bracken intermixed with shrubs and scattered small trees. Here the habitat separation between it and *flavogaster* is especially well marked; *flavogaster*, though plentiful, is nearly restricted to woodland borders. In addition, I found an isolated colony far to the north, on the grassy, shrub-scattered, lower western slope of Miravalles Volcano.

This elaenia can be hard to see partly because of its habitat. Usually it selects a perch inside the foliage, so that, if not for its voice, it would often pass unnoticed. Also, it often shies from close observation. Foraging largely amid branches, it supplements invertebrate prey with vegetable matter. A few "typical" sounds identify this variably voiced bird. A cry absent from the vocabulary of *flavogaster* and *frantzii* is a harsh "chíh-urr," altered also to "chíck-ruh," "weé-ur," "djíkrerrr," or "ít·burr," always burred or buzzy on the longer, lower-pitched second syllable. Among other cries are a burred "chireéz·chireé" not unlike the cry of the flycatcher *Myiopagis viridicata* or the wren *Thryothorus rutilus*, a hoarse "chuhreéir," a burred or buzzy "bzair," and a "wheer" or an unclear short "wheesp" not very different from the heavier note of *flavogaster*.

***Elaenia frantzii* Lawrence**

MOUNTAIN ELAENIA

RANGE: Guatemala to Colombia and western Venezuela.

***Elaenia frantzii frantzii* Lawrence**

RANGE: Costa Rica and western Panama.

The Mountain Elaenia is known chiefly from the cool, cloud-forested central highlands, including the Dota Mountains. It is common on the northern sector of the Talamanca Cordillera, along which, though not reported, it undoubtedly occurs southward to Panama. It is also present on the higher parts of the Guanacaste and Tilarán cordilleras in the northwest. Vertically it ranges from timber line down into the upper sub-

tropical belt but is not common below 4500 to 6000 feet, depending upon local conditions; occasionally it descends to the central plateau. Its semi-open habitat is similar to that of *flavogaster* or identical in the zone of overlap of their vertical ranges. It may also occur commonly inside woods (as *flavogaster* and *chiriquensis* do not), especially at the higher elevations.

This elaenia differs from *chiriquensis* in distribution and voice, but it and the latter are closer to each other in appearance and actions than to *flavogaster*. Unlike *flavogaster*, both are uncrested, uniformly colored below, and not so sharply wing barred. In fact, neither might bring a flycatcher to mind, because they seldom sally for insects and usually do not perch upright, as does *flavogaster*. Fluttering amid branches they pluck small fruits and come to rest forwardly inclined, more markedly in *frantzii* than *chiriquensis*. Compared with its two congeners, *frantzii* flies fast and well, rather like a twisting sparrow, and it engages in longer, more dashing flights. Also, it sometimes goes to the ground for prey.

Its usual note is not particularly distinctive yet is different from that of the other two elaenias. A simple loud "pseer" or "pseur," dropping a bit at the end, or varied to an emphatic "pür," it is stronger than the similar note of the pewee *Contopus lugubris*. It may be roughened to resemble the heavier cry of *flavogaster* or sweetened to a rising "weep" similar to that of *Contopus virens*. Its song is a vireo-like affair of short phrases, alternately burred and chirped, of one to three syllables always accented on the rising last one. The bird makes other sounds, too.

***Myiopagis viridicata* (Vieillot)**

PLACID FLYCATCHER

RANGE: Mexico to western Venezuela, Bolivia, and northern Argentina.

***Myiopagis viridicata accola* Bangs**

RANGE: Nicaragua to Colombia and western Venezuela.

In Costa Rica the Placid Flycatcher is primarily a Pacific species of continuous distribution but with two centers of abundance: the Tropical Dry Forest together with the contiguous lower slopes of the northwestern

divide, and the General-Térraba-Cañas Gordas region in the southwest. It seems to be quite absent from the Golfo Dulce lowlands; otherwise it is generally fairly common in the tropical, as well as the lower subtropical, belt.

It spreads to the Caribbean slope in two places. Rising from the mainland side of the Gulf of Nicoya to the central plateau, on which it is scarce or rare, it overlaps the Caribbean side, so far as known, at subtropical elevations in the Reventazón drainage, where it is seldom encountered. This pattern of distribution is similar to that, for example, of the little woodhewer *Sittasomus griseicapillus*. The species also extends eastward from northern Guanacaste to the Río Frío region, where it is relatively very common, and possibly into the San Carlos sector.

An inhabitant of semi-open country, scrubby woods, woodland edges, and thinned forest, almost always met singly, it is seldom plentiful, even in favorable localities. Though placed by some authorities in *Elaenia*, it differs from Costa Rican elaenias in pattern, proportions, voice, general habits, and temperament. Indeed, its field characterization could apply almost as well to the flatbill *Tolmomyias sulphureus*, which differs obviously only in shape of beak. Like *Tolmomyias*, it moves deliberately amid foliage, changes position by means of a short flit, peers about for food during the intervals, snaps prey from leaves at the end of a fluttering dart, apparently not during a hover, and immediately comes to rest.

The bird gives its simple, slightly variable cry "placidly" from time to time. Sibilant and with a buzzy or burred undertone, something like "reez," "reeiz," "tchriz," "cheez," "chireez," or "cheezweéz," it resembles the inquiring one of the wren *Thryothorus rutilus* and the lighter one of *Tolmomyias sulphureus*. The bird also makes a few weaker, characterless sounds.

Sublegatus arenarum (Salvin)

SCRUB FLYCATCHER

RANGE: Costa Rica to Bolivia and central Argentina.

Sublegatus arenarum arenarum (Salvin)

RANGE: Costa Rica and Panama.

The Scrub Flycatcher is known in Costa

Rica only from the shores along the Gulf of Nicoya and its entrance, where it is confined to mangroves. Unlike my experience with the mangrove-inhabiting *Myiarchus ferox*, I did not find it farther south in the mangroves near Parrita or at the head of the Golfo Dulce. Within its special habitat, this flycatcher occurs mostly on solid ground, such as islets of thickety, open woodland or scrub. It keeps close to or within a few yards of the ground and forages by means of little sallies. It is not a common bird, and I happened to see it only singly. It impressed me as somewhat elaenia-like in appearance, because of its small bill and plain dull style of coloration. I heard it utter only a characterless trill.

Camptostoma imberbe Sclater

BEARDLESS TYRANNULET

RANGE: Southwestern United States to Costa Rica.

Camptostoma imberbe imberbe Sclater

RANGE: Southern Texas to Costa Rica.

The Beardless Tyrannulet reaches its southern geographic limit at the entrance to the Gulf of Nicoya in northwestern Costa Rica. Here its center of abundance is in the Tropical Dry Forest from the Tempisque basin northward to the transition with the moist subtropical belt along the lower slopes of the Guanacaste Cordillera. I also found it not uncommon in the Río Frío region, this being the only Caribbean report. It inhabits thickety, scrubby vegetation scattered through the ranch lands, woodland borders, and patches of woods, but not isolated trees in open pastures or the shaded interior of tall forest.

This weakly bush-crested tiny flycatcher is usually seen singly outside the nesting period. It perches low as a rule, from eye level to a few yards up, but may forage considerably higher in the trees, sometimes among bare branchlets in the crown. It alternates quiet sitting and rapid short flits aimed at insect prey or vegetable matter. It also feeds like a warbler when it flutters at foliage, then moves a few inches to a foot to repeat the procedure.

Its song consists of rather gentle, "refined" notes, "ee ee ee ee ee," that increase in volume at the middle of the series. The call note, a rather piercing thin "peeéuk" (one syllable),

approaches that of the flycatcher *Onychorhynchus mexicanus*, feebly rendered.

The Beardless Tyrannulet has sometimes been considered a winter visitant in Costa Rica and conspecific with Temminck's Tyrannulet (*C. obsoletum*). The Beardless, a member of the Central American arid Pacific avifauna, and Temminck's, a South American species that prefers moister environments, meet and overlap in southern Guanacaste. Also, one need no longer doubt that the Beardless breeds here. On May 29, 1961, at Hacienda El Pelón in northern Guanacaste, I collected a male with greatly enlarged gonads. In early April, 1962, at Los Chiles in the Río Frío region, I found a nest with two baby birds, continually uttering a two-note call, being fed by both parents.

***Camptostoma obsoletum* (Temminck)**

TEMMINCK'S TYRANNULET

RANGE: Costa Rica to Bolivia and northern Argentina.

Camptostoma obsoletum flaviventre

Sclater and Salvin

RANGE: Costa Rica and Panama.

Temminck's Tyrannulet is confined to the tropical belt along the Pacific slope, mostly in the lowlands, from the Tempisque basin (and perhaps the northwestern divide) southward to Panama. It is scarce to uncommon in the dry-forested northwest, where it is sympatric with the Beardless, but increases in numbers in the humid life zones until it becomes not uncommon in the far southwest, where it rises to the upper limits of the tropical belt.

Temminck's is very much like the Beardless Tyrannulet in general appearance, behavior, and voice. Aside from brighter color and markings, it differs perhaps also in the regularity with which it flicks, or rather pushes or flaps, its tail part way up and down, its greater frequency higher in the trees, in following what seem to be established foraging rounds at the same time daily, and inhabiting, in part, more heavily foliated, larger-leaved arborescent vegetation in a more humid climate. I have also found it in scrubby openings in the southwest, similar in appearance to environments in Guanacaste, as well as in mangroves. In addition, it may occur in family-sized groups, generally with

crown feathers raised as in the Beardless, but differing in often keeping its tail partly cocked. Calling frequently, it moves leisurely among branchlets, usually from below medium heights in the trees to eye level in scrub. It stops regularly to look around, sometimes about-facing to peer in the opposite direction.

Of its several similar calls one consists of four or five "psee"'s (with a flycatcher's "wheer" quality) and speeds up a bit as it ends; another, of several downscale, wearily whistled "pee"'s, which bring *Ornithion* to mind; another, of an insistent set of four to six equal-valued wiry "psee"'s (or "pee"'s or "wee"'s). A "whee" (or "wfee" or "peer") whistled in minor key is similar to but stronger than that of the tyrannulet *Tyranniscus vilissimus*, though that of the latter does not sound sad or despondent. The bird also makes a twitter, a loose or throatily clattering little rattle, and a "weéuh" similar to that of the Beardless.

***Tyranniscus vilissimus* (Sclater and Salvin)**

PALTRY TYRANNULET

RANGE: Southern Mexico to Colombia and Venezuela.

***Tyranniscus vilissimus parvus* Lawrence**

RANGE: Nicaragua to northwestern Colombia.

The Paltry Tyrannulet inhabits most of the humid parts of the country from the lowlands of both coasts upward through the lower montane belt in the interior. It is generally uncommon to rare in the Tropical Dry Forest, perhaps entirely lacking north of the lower Tempisque Valley, and scarce from the mainland side of the Gulf of Nicoya eastward across the central plateau. It is met regularly, often commonly, over the rest of its broad latitudinal and altitudinal range. Usually it is seen singly as one of a number of individuals scattered about. If its simple call be learned, the species turns out to be one of the most common in the country.

A nonforest bird, this tyrannulet occurs to the very border of forest, even in heavily wooded regions, in shaded plantations, tree-scattered agricultural and pasture lands, cut-over woodland, and openings in second-growth woods, below the montane belt. Habitually it frequents the crowns of small to

medium-sized, well-foliaged trees. Standing stiffly and appearing unexpectedly long-legged, its relatively long and narrow tail often cocked, this plain-colored little bird has a self-identifying "look." It might bring to mind a stub-billed vireo as it moves about and forages rather actively on the outer foliage. It takes berries and insects, flitting for the former and generally making short sallies for the latter.

It is an undistinguished vocalist whose simple note is often easily recognized when given singly, not in repetition. Similar to that of *Myiarchus tuberculifer*, but higher-pitched, lighter, and shorter, it is either a somewhat sadly whistled "peer" (or "peeip"), dropping slightly at the end, or a stronger "peeir." A longer call is a patterned "pee pee·pee·pee·pee·pee." Another begins with the usual note repeated several times, followed by four quicker notes rising successively steplike, then the single note again a few times in repetition, and so on, in a conversational manner.

Acrochordopus zeledoni (Lawrence)

ZELEDÓN'S TYRANNULET

RANGE: Costa Rica to Peru.

Acrochordopus zeledoni zeledoni (Lawrence)

RANGE: Costa Rica and western Panama.

Zeledón's Tyrannulet is rare or at best very uncommon in Costa Rica. It is known from only six localities scattered over the central highlands, mostly on the Caribbean versant of the Cordillera Central, and in the Dota Mountains. The bird is undoubtedly present along the Talamanca Cordillera although not yet reported. Evidently it inhabits the cool and very humid middle altitudes in both the subtropical and lower montane belts. It is arboreal, keeping at medium heights or lower in the trees, and apparently follows forest borders and frequents well-treed openings in forested country.

This tyrannulet bears a superficial resemblance to the abundant *Tyranniscus vilissimus* with which it might easily be confused if not for its reddish or pinkish mandible. It is, moreover, warbler- or tanager-like in its foraging and nervous activity, troops livelily about in small-sized pure groups, and has an arresting call. This call, not unlike that of the flatbill *Tolmomyias assimilis* of the lower

Caribbean slope, is an excited-sounding, strongly insistent "psss psss psss" in keeping with the animated behavior of the bird. The bird also makes a single "pss" of altered character as it drops mournfully, as well as scratchy buzzing sounds.

Ornithion semiflavum (Sclater and Salvin)

YELLOW-BELLIED TYRANNULET

RANGE: Southern Mexico to Costa Rica (and probably adjacent southwestern Panama).

The Yellow-bellied Tyrannulet is distributed over the humid Pacific southwest from the entrance to the Gulf of Nicoya southward to the Golfo Dulce region; it is still not recorded from nearby Panama. In addition, I identified it uncertainly in the Río Frío region. It is thus far known only in the tropical belt, from the lowlands upward to the transition with the subtropical belt. It occurs primarily in wooded areas, but I do not recall finding it in the interior of tall forest. It frequents the borders of woodland and openings with trees, of which it seems to prefer the smaller ones. It is an uncommon bird which I have seen alone and in two's.

The modern tendency is to lump the Central American *semiflavum* with the South American *brunneicapillum*, because they are very similar, supposedly allopatric forms of which the respective ranges, bypassing each other, terminate in Costa Rica. Here both forms inhabit the humid tropical belt, one on the Caribbean side, the other on the Pacific side, barred from meeting by the cordilleras that run the length of the country. Their minor physical differences are mostly of the sort expected in conspecifics. The color of the crown, however, is gray in *semiflavum*, brown in *brunneicapillum*. This difference between birds that are otherwise so similar could, in my opinion, be a major one indicative of others of hidden magnitude. Vocally, too, they are similar but with distinct differences, the taxonomic significance of which is also a matter of opinion. (See *O. brunneicapillum*.)

Two distributional anomalies stand out. First, *semiflavum* is nearly confined in Costa Rica to the Pacific southwest, completely isolated from the main range farther north; this population is indistinguishable from the northern birds. Only the woodhewer *Dendro-*

cincla anabatina also has this precise pattern of disjunct distribution. Second, it has been recorded from Caribbean Nicaragua (Río Escondido and Greytown) beside Costa Rica, while *brunneicapillum* has been taken a little farther south in adjoining Costa Rica. Hence the two forms probably occur together in the intervening coastal plain. It is unlikely that this area is inhabited by neither in the absence of an obvious physiographic or climatic barrier. Also, I assign *semiflavum*, on the basis of voice, to the Río Frío region; this population is probably continuous with the one in Nicaragua. As intergrades are not known from either northeastern or northwestern Caribbean Costa Rica, I confidently keep the two as distinct species.

Ornithion brunneicapillum (Lawrence)

BROWN-CAPPED TYRANNULET

RANGE: Costa Rica to northwestern Ecuador and Venezuela.

Ornithion brunneicapillum brunneicapillum
(Lawrence)

RANGE: Caribbean Costa Rica to northwestern Ecuador.

This South American tyrannulet is restricted to the Caribbean slope in Costa Rica, where the species reaches its known northern limit in the northeastern lowlands; it has not yet been recorded westward in the direction of the continental divide. It is fairly common to rather plentiful in the tropical belt and rises into the lower subtropical belt, at least in the Reventazón Valley. A forest-based species, it is found inside forest, along its borders, in second-growth woodland, and occasionally in the shaded semi-open in wooded country.

In the forest it keeps from medium heights to, usually, high in the trees, and is met mostly as an accompanying member or two of a traveling mixed bird party, unlike *semiflavum*. When not roaming with a band, it occurs alone or in two's at almost any height and is most apt to be seen outside the forest. Though hard to locate because of its very small size, the unaccompanied bird is not shy and can be squeaked into view. It is quite active in the manner of a tit, and it flicks and jerks continually.

Its distinctive, strongly patterned call

identifies the bird sight unseen and proves its often unsuspected presence. Consisting of several thinly musical but strong "wee"'s, it begins with a single "wee," continues with several rapid "wee"'s going consecutively downscale, and finishes with a lengthened "wee" that rises in a questioning arc. The diagnostic last note may be omitted, or placed in front of the call, or given alone. Even without it the call is instantly recognized. The bird also gives a single high "weep" equivalent to the first note in the call, a sharp "peer," a "seep" or "weep" like that of *Tyranniscus vilissimus* but shorter and sibilant, and abrupt "pupping" notes of the sort given by *Capsiempis*.

By comparison, the call of the closely related *semiflavum*, which bears a watered resemblance to that of *brunneicapillum*, is not instantly recognizable. It usually consists of three to five "dee"'s, more or less on the same level, similar to those of a euphonia but in a minor key, sometimes with the last note raised but not conclusively. The bird also gives a single "dee" and a fairly quick, minor "psée."

Leptopogon superciliaris Tschudi

GRAY-CAPPED LEPTOPOGON

RANGE: Costa Rica to Bolivia and northwestern Brazil.

Leptopogon superciliaris hellmayri Griscom

RANGE: Costa Rica and western Panama.

The species is at its northern geographic limit in Costa Rica, where it is represented by the race *hellmayri* (Griscom, 1929, p. 175). There it is primarily an inhabitant of the cool and wet subtropical belt. Its distribution covers the foothills and slopes of the Cordillera Central on the Caribbean slope and the Dota region and the Talamanca Cordillera on the Pacific slope. It has not been recorded from the Caribbean side of the Talamanca Cordillera, where it is almost surely present, or from the northwestern divide, along at least part of which it probably extends. It is met most often in the very humid portions of the central highlands. On the Pacific slope its status varies from not uncommon to very common, at least locally, along the slopes that rise inland from the General-Térraba-Coto Brus valleys.

The species occurs almost exclusively in forested regions, where it follows natural breaks in the hilly rough terrain. Usually it is seen alone or in separated two's, often in the company of mixed arboreal bands of roving insect-eating birds. It keeps from fairly low to rather high in the trees and seems to prefer the less-foliaged portions of the branches. This narrow-billed flycatcher acts rather like the flatbill *Tolmomyias sulphureus* (a non-forest species) as it changes perches and looks around for prey, but its movements are quicker and its sallies more frequent; it gleans little or not at all. Its aerial sorties are mostly short flits, and the bird may hover at foliage.

Its usual cries are a "wisst" or "wirst," similar to that of the tanager *Thraupis palmarum*, and a trill having the same quality. A longer call sounds like "witsirrr witsirrr rrrrrp," with the last syllable rippled in typical flycatcher fashion. The bird also makes an open-mouthed "tchrik tchrik" and a sharp "tswit," "tswirt," or "pwzt."

***Leptopogon amaurocephalus* Tschudi**

BROWN-CAPPED LEPTOPOGON

RANGE: Southern Mexico to Bolivia and northern Argentina.

***Leptopogon amaurocephalus faustus* Bangs**

RANGE: Nicaragua to northwestern Colombia.

Little is known about this species in Costa Rica. On the Caribbean slope proper it has been found only at the very wet northern base of the Cordillera Central, somewhat below the range of the subtropical *superciliaris*. Along the humid northwestern divide, from which *superciliaris* has not been reported, it has been found in at least three subtropical localities from Lake Arenal northward along the Guanacaste Cordillera. In the humid Pacific southwest it has been recorded from two tropical-belt localities in the Térraba Valley, and I found it at 4300 feet in the Cañas Gordas district beside Panama, where I would have expected *superciliaris* instead. As yet, *amaurocephalus* and *superciliaris* have not been taken at the same site.

My very limited experience with the species suggests that it may differ somewhat in

habitat preference and actions from the congeneric *superciliaris*. Like the latter, it apparently also dwells inside forest, or in patches of forest, but it keeps lower in the trees and in tangled portions of the understory, is quite solitary, and seems to perch quietly and not to be particularly active. Sometimes it appears sedentary; at other times I have seen it with mixed bands. I have no notes on its voice.

***Mionectes olivaceus* Lawrence**

OLIVE-STRIPED FLYCATCHER

RANGE: Costa Rica to Peru and Venezuela.

***Mionectes olivaceus olivaceus* Lawrence**

RANGE: Costa Rica and western Panama.

This slender-billed flycatcher, here at its northern limit, is distributed in the cool and wet middle altitudes, rather commonly in the subtropical and lower half of the lower montane belts and uncommonly higher in the lower montane belt. Occurring on both slopes, it is most abundant on the Caribbean versant of the central highlands. It has been reported once from the vicinity of the Aguacate Mountains, is present, perhaps uncommonly, along the Guanacaste Cordillera, probably also along the Cordillera de Tilarán, where it has not yet been recorded, and is known from the Dota Mountains and the Pacific slope of the Talamanca Cordillera (and undoubtedly its Caribbean slope, too). It seems to be a seasonal visitant or wanderer to the tropical belt, at least in the northeastern lowlands, where I saw it several times in December and January.

The Olive-striped strongly resembles the closely related *Pipromorpha oleaginea*. Like the latter, which it mostly replaces altitudinally, it inhabits forested regions. It is usually solitary, may or may not accompany traveling mixed bands, and occurs inside and beside forest as well as in bushy openings. Again like *Pipromorpha*, it generally keeps at about eye level, but sometimes rises higher in the trees. It looks around deliberately and nods as inquisitively as *Pipromorpha*, yet is as nervous as a warbler or antwren. Habitually it flicks a single wing in the manner of the perched *Pipromorpha*. Its movements are sudden. Springing from a perch, it forages

while hovering or clinging, then unexpectedly comes to a dead stop on a branch. It may forage also by hanging back downward from the under side of a twig. Sometimes it goes to the ground. Though I met the bird many times, I was unable clearly to note its voice.

Pipromorpha oleaginea (Lichtenstein)

OLEAGINOUS PIPROMORPHA

RANGE: Southern Mexico to Bolivia and Brazil.

Pipromorpha oleaginea assimilis (Sclater)

RANGE: Southern Mexico to Caribbean Costa Rica.

Pipromorpha oleaginea dyscola (Bangs)

RANGE: Pacific slope of Costa Rica and western Panama.

The distribution of the pipromorpha covers most of the country from both coasts to at least 5000 feet. A common species, it is most abundant in the lowlands, occurs in fair numbers in the lower subtropical belt, but is seldom met higher. The habitat includes deep forest, thinned woods, and woodland borders. The bird even shows up regularly in plantations with a few scattered shade trees. In the woods it generally perches low and seldom forages above moderate heights from the ground, but it may rise very high in the trees when attracted to a traveling mixed band. I rarely saw more than a single bird at a time on the Caribbean side; I did see small parties in the Pacific southwest.

Though not really an inactive bird, it appears sluggish because it may permit the observer a close approach. The same individual can be found calling day after day at the same place in the woods, as if it had not moved at all. As do flycatchers generally, it may perch in one spot for varying lengths of time between bursts of activity. It snatches insects from leaves at the end of a short flutter, sometimes clinging for a few moments, and it moves amid foliated branches almost like a vireo busily seeking prey or small fruits, stopping only to call. It changes perches after each sally as do many small woodland flycatchers. Though seemingly at rest, it may continually flick a single wing,

sometimes jerking around on its perch or twitching its body nervously. The bird has an eager bent-forward "look," most obvious when it alights. The creature then keeps extending its head and drawing it back (not nodding) in, so to speak, an alertly aggressive manner.

Its unmistakable call may be given throughout the day during the larger part of the year. It consists of a number of squeaky chips interspersed with several consecutive "toots" or little honks like those of a distant Amazon parrot (*Amazona farinosa*). I have transcribed it as "pip·pip toot·toot·toot yeet·yeet·yeet·yeet," with the "toot" (as in "foot") sometimes sounding like a reedy "tirt." This absurd "song" usually brings a smile to the listener's face. The bird also makes single "chip" 's which are to some extent recognizable. Both races sound the same to me. As noted by Carriker (1910, pp. 712-714), birds from Guanacaste are intermediate in appearance between the Caribbean *assimilis* and the southwestern *dyscola*.

FAMILY OXYRUNCIDAE

Oxyruncus cristatus (Swainson)

SHARPBILL

RANGE: Costa Rica, Panama, Guianas, southeastern Brazil, Paraguay.

Oxyruncus cristatus frater (Sclater and Salvin)

RANGE: Costa Rica and western Panama.

The Sharpbill is very poorly known in Costa Rica. It has been found occasionally on the Caribbean versant of the central highlands, rarely along the Caribbean side of the northwestern divide and in the Dota Mountains. Probably it is present along both slopes of the Talamanca Cordillera. It is confined mostly to cool and very humid portions of the subtropical belt, but apparently also occurs higher in the lower montane belt. The bird evidently prefers heavily forested regions where, if perhaps not hidden from sight in the canopy, it is to be seen at forest openings, along the borders of forest, and in adjacent parklike clearings adorned with epiphyte-laden tall trees. I saw it only twice, once at Cariblanco and once at La Hondura,

on the north slope of the Cordillera Central. Both times it was at medium height on a heavily foliated tree. It moved about upon and inside the foliage, clinging and hanging upside down while feeding on small berries. I do not know what it sounds like.

OSCINES

FAMILY HIRUNDINIDAE

Progne chalybea (Gmelin)

GRAY-BREASTED MARTIN

RANGE: Southern Texas to Bolivia and central Argentina.

Progne chalybea chalybea (Gmelin)

RANGE: Southern Texas to Peru and Brazil.

This resident martin is distributed from the central highlands and parts of the subtropical belt the length of both slopes down to sea level. It is absent from solid woodland, but may occur almost anywhere in open country. Its greater numbers on the central plateau and in the northwestern lowlands are attributable to the extensive clearing of the land. The bird is now found also at formerly forested areas in the Caribbean lowlands where it was unknown a generation ago. The distribution is spotty even in apparently favorable localities, and, in general, the bird is met irregularly. It is common in the city of San José but not nearly so abundant as *Pygochelidon*.

It prefers isolated tall trees largely free of foliage in which to establish a small colony. Here the birds nest in holes and rest on the bare branches, usually high above the ground. It is apt to frequent buildings, and many pairs may nest side by side in the eaves. It does not seem to quarter low over a field as do the smaller swallows, at least not when it and another species occur together. Hunting higher, it approaches the ground only during a diving loop which returns the bird smoothly to its original height in the air. It lights on the ground much more frequently than the other swallows, and it does not walk so awkwardly. It is the only swallow in the country that I have seen patrolling the seashore and dropping upon the open beach to feed on insects.

Its voice is smoother and more musical

than the twittering or guttural one of other swallows. The notes sound like "choor," "choot," or a heavy "choorrr" (the "oo" as in "foot"). The "song" consists merely of a number of these notes given in an irregular up-and-down pattern, with slight changes in pitch. The bird also utters undistinguished notes more like those of the other species.

Petrochelidon pyrrhonota (Vieillot)

CLIFF SWALLOW

RANGE: Breeds in North America and Mexico; winters chiefly in southern South America.

Petrochelidon pyrrhonota pyrrhonota (Vieillot)

RANGE: Breeds in North America; migrates through Central America; winters in southern South America.

[*Petrochelidon pyrrhonota melanogaster* (Swainson)]

RANGE: Breeds in Mexico and adjacent southwestern United States; migrates through Central America; winters in southeastern South America; not recorded from Costa Rica.]

Petrochelidon pyrrhonota tachina Oberholser

RANGE: Breeds in southwestern United States; migrates through Central America; winters probably in South America.

The Cliff Swallow is a passage migrant in spring and fall, but does not winter in Costa Rica. It migrates along both coasts as well as inland to at least the altitude of the central plateau. Though not so abundant in migration as Barn and Bank Swallows, it is to be seen regularly, especially along the beaches and also in the coastal lowlands. Only in the interior of the country have I seen tarrying individuals quartering low over cleared areas or resting on wires lined with other migratory swallows. The only note I have heard is a metallic "et" or "ert."

[*Petrochelidon fulva* (Vieillot)]

CAVE SWALLOW

RANGE: Breeds in southwestern United States and eastern Mexico, also Greater Antilles; apparently migrates in part through Central America.

***Petrochelidon fulva pallida* Nelson**

RANGE: Breeds in southern Texas and northeastern Mexico; may migrate through Central America; winter range unknown.

The Cave Swallow is listed for Costa Rica by the American Ornithologists' Union (1957), Miller and others (1957), and Peters [1960 (1931–1962), vol. 9]. Its occurrence is apparently based on the report of a specimen collected April 6, 1932, at El General in the Pacific southwest by Austin Smith (1934). Evidently it was identified by Smith in the absence of comparative material. As I have not been able to find this specimen, I place the species on the hypothetical list.]

Hirundo rustica* Linnaeus*BARN SWALLOW**

RANGE: Breeds in Northern Hemisphere; winters southward.

***Hirundo rustica erythrogaster* Boddaert**

RANGE: Breeds from Alaska to Mexico; winters from Mexico to Tierra del Fuego.

The Barn is by far the most numerous of the migrant swallows during transience in the spring and fall and the only one found regularly, though locally and not commonly, in the winter. From the end of August into October, and from early March well into May, it passes over the entire country, from both coasts inland and through the central highlands. The observer is most impressed along the beaches, where the species troops by interminably in low-flying, group-sized waves for weeks on end. In the lowlands behind the coasts, the birds almost always fly high in a direction more or less parallel with the coastline. The only summer record (July 5) is that of an individual reported by Skutch (1944c). In winter the species is to be seen from time to time in open areas: the northwestern lowlands, the southwestern savannas, and at airports. It seems to be quite absent from forested regions even when these have large openings. The only note is a "krik" or "swik" or a metallic "whit."

Stelgidopteryx ruficollis* (Vieillot)*ROUGH-WINGED SWALLOW**

RANGE: Southern Canada to Bolivia and northern Argentina.

***Stelgidopteryx ruficollis serripennis* (Audubon)**

RANGE: Breeds in North America; winters from southern United States to Panama.

***Stelgidopteryx ruficollis fulvipennis* (Sclater)**

RANGE: Southern Mexico to highlands of Costa Rica and western Panama.

***Stelgidopteryx ruficollis uropygialis* (Lawrence)**

RANGE: Southeastern Nicaragua to northwestern Peru.

The Costa Rican status of the several forms of the Rough-winged Swallow is uncertain. The easily recognized resident *uropygialis* is widespread and common from both coasts well into the central highlands. *Fulvipennis* seems to occur principally, perhaps exclusively, at subtropical elevations in the central highlands and along the Guanacaste Cordillera; birds in breeding condition have been taken sympatrically with *uropygialis*. Skutch wrote (1960, pp. 265–266): "At Vara Blanca, between 5500 and 6000 feet above sea level in the Costa Rican highlands, I first noticed Rough-winged Swallows, both light-rumped and dark-rumped forms, in mid-March, and they at once took an interest in old burrows in the roadside banks." The migrant *serripennis*, which has been taken at widely separated localities, seems to be the least common of the regularly transient swallows. It is present in winter, but I have no information as to its abundance or distribution. (*S. r. decolor* Griscom, which may occur in the same places as *uropygialis* in the southwest, the region for which it was described, was considered "a very unstable form, consisting of intergrades of varying degree between *uropygialis* and *fulvipennis* and its recognition in nomenclature . . . highly disputable" by Hellmayr [Cory *et al.*, 1935 (1918–1949), pt. 8, p. 44, footnote].)

The Rough-winged Swallow, as a species, inhabits open and semi-open country, including cleared places in forested regions. It is generally seen alone, sometimes in two's. It is rather a sedentary bird that returns from lengthy sorties to favorite perches. Usually it selects bare twigs at no great height from the ground. Perched, its clothespin proportions make it look different from other kinds of swallows. Its usual notes are an upturned "shrirk" and a "djreet."

Pygochelidon cyanoleuca (Vieillot)

BLUE-AND-WHITE SWALLOW

RANGE: Costa Rica to Tierra del Fuego; southern birds winter northward.

Pygochelidon cyanoleuca cyanoleuca (Vieillot)

RANGE: Costa Rica to Bolivia and Argentina.

[Pygochelidon cyanoleuca patagonica
d'Orbigny and Lafresnaye

RANGE: Breeds in southern South America; recorded in Panama and Nicaragua.]

The Blue-and-white Swallow, a resident, occurs throughout the central part of the country, from the lower subtropical belt on the Caribbean approaches to the central highlands, across the central plateau, to above timber line on the high volcanoes. I found it at only one locality in the northwest (Monteverde on the Pacific face of the Cordillera de Tilarán), but there it was abundant. As this cordillera can be considered a northwestward extension of the Cordillera Central, it is probably populated by the bird continuously. The species is present in good numbers on the northern sector of the high Talamanca Cordillera, along which it is almost certainly distributed to Panama.

A disjunct southwestern population inhabits the savannas of the Térraba region. There I saw the bird commonly at Potrero Grande and Buenos Aires and less often in the lower Coto Brus Valley, all at tropical-belt elevations. Oddly, it was absent from suitable open country in the subtropical belt above Potrero Grande. Apart from a few low-lying pockets along the Cordillera Central, I know of no other Costa Rican occurrence well below the subtropical belt. Later I found it at Cañas Gordas near Panama, the only subtropical locality at which I have seen it in the southwest.

The bird evidently prefers open country, such as the deforested central plateau and its neighboring slopes; it is abundant in the city of San José. It also occurs commonly in clearings, openings, and at breaks in heavily forested parts of the cool middle and high altitudes, especially in the central highlands. It forages from low above the ground to very high. In the air it rather resembles the much

larger *Progne chalybea* in general appearance and martin-like proportions. It often hovers beside a trunk or in front of a leafy limb, and it may weave about tirelessly at a particular site. Its usual sounds are a wiry, musical "tsee" or "tseer," a sort of "ts·ts·ts·rrr," and a clearer "tseét tsritit." It also makes a sibilant rising "ss·ss·ss·ss·ss."

Riparia riparia (Linnaeus)

BANK SWALLOW

RANGE: Breeds in Northern Hemisphere; winters southward.

Riparia riparia riparia (Linnaeus)

RANGE: Breeds in North America and Palearctic Region; in New World winters in South America.

The Bank Swallow ranks next in numbers to the Barn during transience in the spring (April–May) and fall (September–November). It follows the coasts and lowlands along both slopes, though possibly avoiding the dry-forested Pacific northwest, and occurs to elevations above those of the central plateau. As do the migrating Cliff and Rough-winged Swallows, it flies as a rule low above the beach and much higher in the air inland. The latest fall date, to my knowledge, is November 17. There is no evidence that the bird winters in Costa Rica.

Iridoprocne bicolor (Vieillot)

TREE SWALLOW

RANGE: Breeds in North America; winters from southern United States to Nicaragua and in West Indies; recorded in Costa Rica, Panama, and northern South America.

The only record of the Tree Swallow in Costa Rica is that cited by Wetmore (1958), who reported "3 males of this species in the . . . [British] museum taken by C. H. Lankester February 4, 1918, at Colonia El Salvador, Province of Heredia, on the Caribbean slope of northeastern Costa Rica." Possibly it is not so rare a Costa Rican transient or wanderer as indicated, since Wetmore (1958) "near Changuinola, Province of Bocas del Toro, Panamá, . . . saw more than 100 on January 17, 1958, and where on March 4 . . . [he] shot a male from a group of several flying with Barn and Rough-winged Swallows."

***Iridoprocne albilinea* (Lawrence)**

MANGROVE SWALLOW

RANGE: Mexico to Panama; western Peru.

***Iridoprocne albilinea albilinea* (Lawrence)**

RANGE: Mexico to Panama.

This river swallow is distributed the length of both coasts, where there are mangroves and also where there are not, and follows slow-flowing lowland rivers well inland to their meeting with rising slopes. To my great surprise I once found a lone individual, in February, up at 1100 feet beside the Río Coto Brus. It is most abundant at river mouths, both coastally and inland at the confluence of tributaries; at such places it is to be found throughout the year. In the interior, however, its numbers fluctuate, and the bird may be absent seasonally upstream from a river that frequently rises in flood. Even along the coasts the bird appears to move about locally. On the Pacific shore, at any rate, I have seen Mangrove Swallows that seemed to be traveling with migrant swallows from the north.

The Mangrove is a social swallow that generally occurs in small groups the members of which perch close together on a partially submerged log or a snagged limb, but they hunt individually. The perched birds may show a white patch on each side of the rump, have their "thighs" flagged, and hold the tail at the same level as or higher than the head. This swallow always forages over water, flapping and sailing close to the surface on its relatively short, wedge-shaped wings, then rising in order to wheel and retrace its course, along what appears to be a feeding territory that occupies a segment of the river. In speedier flight the wing beats are more swallow-like. At coastal river mouths the bird is often seen afoot on the beach or on sand flats. Here several individuals may occur together, perhaps spaced a little apart, all facing the same direction, resembling tiny terns but for the bill. To save distance a bird may cross a spit or headland, flying over medium-sized trees to another pool, embayment, or estuary. Its swallow-like notes can also sound like those of some small sandpiper: "djit" or "trrit."

***Tachycineta thalassina* (Swainson)**

VIOLET-GREEN SWALLOW

RANGE: Breeds in western North America

and Mexico; winters south to western Panama.

***Tachycineta thalassina lepida* Mearns**

RANGE: Breeds in western North America; winters to western Panama.

The only winter record is that of a specimen collected February 7, 1924, by Austin Smith at Punta Piedra, situated at sea level somewhere on the Nicoya Peninsula. I know of only two other occurrences, both reported by Cherrie (1895a). One is of a bird taken at Bebedero in the Guanacaste lowlands at the head of the Gulf of Nicoya; there are no other data. Cherrie said about the other (1895a): "While collecting at the mouth of the Matina River (Atlantic coast) in the latter part of March I found the Violet-green Swallow not uncommon in company with *T. albilinea*. Perfect friendship seemed to exist between the two species. *T. albilinea* was breeding commonly." Evidently the Violet-green Swallow may occur as a rare or irregular transient or winter visitant in the lowlands on either slope.

FAMILY CORVIDAE***Calocitta formosa* (Swainson)**

MAGPIE JAY

RANGE: Western Mexico to Costa Rica.

***Calocitta formosa pompata* Bangs**

RANGE: Southern Mexico to Costa Rica.

The Magpie Jay is one of the typical inhabitants of the Pacific northwest. It is conspicuously abundant in the Nicoya Peninsula and Guanacaste, less plentiful southward in the Puntarenas-Barranca district to somewhat beyond the Pacific Railroad, and apparently does not quite reach the southern limit of the Tropical Dry Forest. It barely rises from the tropical belt to the moist-forested subtropical belt along the northwestern divide where, especially along the Guanacaste Cordillera, it still occurs in abundance and narrowly overlaps the range of the Brown Jay. Above the boundary between the scrubby cattle country and the descending wooded slopes, the Magpie Jay suddenly disappears.

This jay is found almost without exception in small noisy bands the members of which usually glide about as they move from site to

site. Like the Brown Jay, it exhibits a bold curiosity linked to an excitable temperament, but its alarmed-sounding cries are not so irritating. Its flight, alternating several beats and a smooth level sail, is gracefully enhanced by the flowing, wedge-shaped tail. In slow flight, however, the bird bounces with every beat in the characteristic manner of the Brown Jay. Most kinds of vegetable or animal food not too large to handle arouse its interest. Occasionally it goes to the ground where, with its long tail stiffly tilted upward, it hops awkwardly. It may settle and even hop for a moment on the back of a horse or a cow, presumably in search of a bloated tick.

The Magpie Jay utters many different cries, some apparently mediocre imitations of those of other birds. Probably the most common and most distinctive is a guttural rasping "rää rää," similar to but lighter than that, for example, of the tanager *Habia fuscicauda*. Others include a scratchy note which, when repeated several times, resembles the cry of the Brown Jay, a throaty rolling "ttrrip" not unlike that of the grackle *Cassidix mexicanus*, a harsh note with an underlying grate or "chickle" reminiscent of many icterids, a "yowp" not unlike that of the Black-chested Jay, metallic pulley-like squeals, a piglike little grunt, "kukukuk" sounds mixed with harsh ones and throaty like those of Wagler's Oropendola, a weak throaty popping such as the muffled rattle of a wooden ball shaken inside a small box, gagging sounds, and parrot-like cries.

***Psilorhinus morio* (Wagler)**

BROWN JAY

RANGE: Eastern Mexico to northwestern Panama.

***Psilorhinus morio cyanogenys* Sharpe**

RANGE: Southeastern Mexico to northwestern Panama.

The wide but not uniform distribution of the Brown Jay from sea level well into the lower montane belt in the central highlands coincides with the spread of cleared country rather than physiography. Thus it is very common on the central plateau and locally abundant in agricultural lands and parklike openings down the Caribbean slope to the

coast. It is scarce in or virtually absent from extensively forested portions of the Caribbean lowlands. I was surprised, however, not to find it in the apparently suitable Río Frío region. From the central highlands it extends northwestward along the continental divide, from which it rarely descends into the Tropical Dry Forest. Except for a record from the Dota Mountains, it is completely absent from all the southern half of the Pacific slope.

This is the only jay to be encountered throughout most of the central and eastern parts of the country. At one border of its range it comes face to face with *Calocitta formosa* along the Pacific side of the northwestern divide. At another it overlaps *Cyanocorax affinis* in the southeast near Panama. In between it meets *Cyanolyca cucullata* at forest edges along the eastern and northern mountain slopes that enclose the central plateau. Higher up the central highlands it probably comes in contact with *Cyanolyca argentigula*. With the apparent exception of *Cyanocorax* it is ecologically distinct from the others. Why this aggressive bird still has not found its way into the southwest I find hard to explain. The environments appear ideal, and no other jay is present. As the bird does not enter forest in Costa Rica and is rare in heavily wooded regions, it is possible though unlikely that unbroken forest bars the way.

This omnivorous jay varies its diet with baby birds, eggs, and small animals obtained by raiding nests and knotholes and with crops by invading cultivated fields. Sometimes it drops to lawns and short-grassed meadows, where, searching for small-sized prey, it moves in heavy-bodied hops or leaps while holding its tail jauntily cocked. Excitable and bold, restless and noisy, a number of individuals almost always band together. They seem to enjoy worrying hawks and owls, and their irritating cries alert the neighborhood to an intruder, in whose presence the agitated birds hop among the branches, frequently changing perches for a better look, and accompany the cries with head noddings, tail jerkings, and side-to-side shifts of the body. Though ostensibly overcome by rage, the birds usually preserve a certain wariness. Yet at times they fearlessly approach the ob-

server, who can then see the "crop" pushing out, like an egg, at the pop that introduces each cry.

Its Costa Rican name, "piapia," describes this cry, raucous and typically garruline, sounding both annoyed and alarmed. It is either a single "pyaa" or a two-syllable "pa-pyaá" or "pyaá-a," always preceded by the throaty pop. It may be repeated a while by single birds or by several together. Peculiar metallic cooings or iron-pulley scrapings are made, too, usually in a low tone.

***Cyanocorax affinis* Pelzeln**

BLACK-CHESTED JAY

RANGE: Costa Rica to Colombia and western Venezuela.

***Cyanocorax affinis zeledoni* Ridgway**

RANGE: Southeastern Costa Rica and Panama.

This South American jay reaches its northernmost limit in southeastern Costa Rica, south of Puerto Limón. Here it is common only next to Panama in the Sixaola region, possibly in the adjacent Estrella Valley also, at tropical-belt elevations. It is not known whether the bird occurs higher on the slopes of the Talamanca Cordillera. It inhabits woodland and shaded plantations in wooded areas.

It is smaller than the Brown Jay, which it resembles in general appearance, style of coloration, and habits, but differs obviously in voice and in living, at least in part, in forest. Over its limited Costa Rican range it is completely sympatric geographically and in part ecologically with the Brown Jay. Possibly the presence of the apparently more aggressive Brown Jay accounts for the termination of the northward spread of the Black-chested, although the forested Caribbean lowlands would appear to be suitable to it rather than to the nonforest-inhabiting Brown. Probably historical factors kept them apart in the past, whereas the influence of man is responsible for their sympatry at present.

The bird occurs in noisy bands the members of which keep low in the trees or on or near the ground. It is relatively shorter-billed, shorter-winged, and longer-legged than the primarily arboreal *Psilorhinus*, and its

flight is "poor" and often fluttery. It has the habit of holding a food item with both feet and beating it with the beak, and it accompanies a rapid lifting and a slow lowering of its tail with a particular note. This note, a "pyou" or "kyōōp," may be given once or two or three times in succession. Another characteristic cry is a short "chyowp." Also given are a scratchy nasal "ack" or "eck," a reedy or sharp and hard rattle, "tchrikikik," and a short, weak, pulley-like squeal. Its voice is quite unlike that of the Brown Jay, but it somewhat resembles that of the Magpie Jay.

***Cyanolyca cucullata* (Ridgway)**

AZURE-HOODED JAY

RANGE: Southern Mexico to western Panama.

***Cyanolyca cucullata cucullata* (Ridgway)**

RANGE: Costa Rica and western Panama.

The Azure-hooded Jay is known primarily from the Caribbean versant of the central highlands, also the Dota Mountains. It is not reported from the Talamanca Cordillera proper, but I met it in the Caribbean foothills that approach the northern sector. Probably the species is distributed the length of the cordillera on its Caribbean if not on its Pacific slope. In addition, I found it not uncommon at Monteverde on the Pacific slope of the Cordillera de Tilarán, along which it probably occurs continuously; there is no report from the Guanacaste Cordillera. Vertically it ranges from cloud-forested pockets at the lower limits of the subtropical belt well into the lower montane belt and probably higher, with its center of abundance between 3000 and 4500 feet in the subtropical belt. At the upper limits it perhaps occurs with the congeneric *argentigula*; elsewhere it is sympatric with though usually separated ecologically from *Psilorhinus*.

This jay is an inhabitant of wet-forested cool ridges and slopes and visits thinned edges, small banana groves and other openings in woodland, and trailsides. Generally it occurs in lively dashing two's or three's, also in bands of half a dozen or more individuals, occasionally alone. The group activity attracts the observer's attention as these good-sized birds move through the densely foliated

branches from one tree to another, perhaps clinging to or swinging on vines as they make their noisy way. They also forage silently and rather deliberately, uttering at most an occasional note. The members of a group keep moving about, making long leaps from limb to limb and hopping quickly over obstructions. They seldom troop very high in the trees, nor have I seen them drop to the ground. They may or may not react with typically jaylike noisy excitement when aware of the observer, whom they generally leave rather than approach. The bird takes berries and other small fruits but apparently prefers squirming animal prey. Should it secure a soft-bodied large insect, such as a katydid, it removes the legs and antennae by a twist of the bill and it may bite out a few pieces before swallowing the victim whole. Should it be a hard-bodied insect, the bird eats the soft abdomen. This jay also engages in aerial flycatching to a limited degree.

All its cries are arresting. The most striking is an excited, loudly "spinking," almost ringing "peenk peenk peenk peenk peenk" (or "pink" or "tchrink") that suggests a quite out of the ordinary bird. The "spinking" compares with that of an upper key on a piano or xylophone hit consecutively without overtones. Not dissimilar is a sleighbell-like "chink·chink·chink" (or "churnk"). Also given is a low "oink" (or "woink" or "poink"). Other notes are more jaylike, some of them choked, protracted, or scratchy, in part resembling the sound which accompanies the gesture to demonstrate throat cutting. Another is a harsh "ääää" lasting nearly a second, which, if not ducklike, is very unbirdlike, and it may have a spitting quality as it finishes. The bird also makes several other noises.

Cyanolyca argentigula (Lawrence)

SILVERY-THROATED JAY

RANGE: Mountains of Costa Rica and western Panama.

Cyanolyca argentigula albior Pitelka

RANGE: Mountains of central Costa Rica (Cordillera Central).

Cyanolyca argentigula argentigula (Lawrence)

RANGE: Mountains of southern Costa Rica (Talamanca Cordillera) and western Panama.

The Silvery-throated Jay, as represented by the race *albior*, seems to be restricted to the Cordillera Central, where it has been found only on the slopes of the volcanoes Turrialba and Irazú. Though recorded down to an altitude of 4000 feet under cloud-forest conditions, usually in precipitous pockets, it is most common but nowhere abundant in the montane belt, in which it ranges upward to timber line. Elsewhere, the species is represented in Costa Rica by but a single specimen of nominate *argentigula* taken in "Talamanca," probably at high elevation in the vicinity of Pico Blanco (Pitelka, 1951), near Panama. This race is undoubtedly more common than is indicated, as it inhabits largely unexplored territory.

Frequenting the forested portions of its range, this jay is to be met occasionally along breaks, such as ridges and ravines, and at the edges of the parklike highland pastures on the Irazú-Turrialba massif. I found it usually in two's or three's or slightly larger groups. The bird were active and shy, keeping fairly well up in the dense foliage and not straying to an exposed position in the semi-open. I neglected to take note of the voice, which I remember only as jaylike (e.g., *Cyanocitta*).

FAMILY CINCLIDAE

Cinclus mexicanus Swainson

NORTH AMERICAN DIPPER

RANGE: Western North America to western Panama.

Cinclus mexicanus ardesiacus Salvin

RANGE: Costa Rica and western Panama.

The dipper occurs mostly in the central highlands, especially their Caribbean versant, and the Dota Mountains of the Pacific drainage. It is present in unknown abundance along the Talamanca Cordillera in the southwest, but, as I found it also in the foothills on the northeastern approach, I believe it occurs on both slopes continuously into Panama. In the northwest it has not been reported from the Guanacaste Cordillera, but people at Monteverde on the Cordillera de Tilarán claimed to have seen it there, though I did not happen to. In general it is most abundant from about 3000 feet upward into the lower montane belt.

Keeping exclusively to swift mountain

streams and rapid upper portions of larger rivers, hemmed in by forest or not, it frequents boulders amid the turbulent currents and is partial to rocky-ledged gorges and the vicinity of waterfalls. The cocked-tailed bird stands on the mossy rocks, dipping its "knees" and flicking its wings, or walks quickly with flat-footed little steps, or flies up and down the river, following the bends like a kingfisher. It swims and dives in the boiling water as to the manner born. Though not numerous anywhere, it can be counted on, at least during the breeding season, to be present at a particular site. Despite a number of encounters I did not hear it sing. Regularly it utters a somewhat flycatcher-like chatter, and pebbly notes in flight.

FAMILY TROGLODYTIDAE

Cistothorus platensis (Latham)

SHORT-BILLED MARSH WREN

RANGE: Eastern North America and Mexico to Tierra del Fuego.

Cistothorus platensis lucidus Ridgway

RANGE: Costa Rica and western Panama.

Except for a record west of San José, the resident population of Short-billed Marsh Wren is known only from the Caribbean side of the central plateau. It is small in total numbers and scattered locally between 4000 and 5000 feet in the general neighborhood of Cartago at the base of Irazú Volcano. However, it "is abundant wherever it occurs" and "makes its home in the grassy marshes" (Carriker, 1910, p. 772). Most colonies are probably gone now because of draining of the habitat. I believe it was this wren that I heard in a bog above Santa Cruz on Turrialba Volcano. Almost surely it occurs in suitable places along the Talamanca Cordillera and possibly elsewhere in the country, too.

I observed it only at Laguna de Coris near Cartago in the dry season. This laguna is a shallow depression, featuring a few hot springs, that becomes flooded during the rainy season, when herons and shore birds are apt to appear. Here the Short-billed Marsh Wren was abundant in an extensive dry field covered with clumped "janeiro" grass (*Eriochloa polystachya*). I did not see a single individual outside this habitat or in the

sedges that surround the seeping springs. Its habitat-sharing neighbors included the meadowlark *Sturnella magna* and the finches *Tiaris olivacea*, *Volatinia jacarina*, and *Zonotrichia capensis*. Along the edges were two other wrens, *Thryothorus modestus* and *Troglodytes musculus*. The Mourning Dove (*Zenaidura macroura*), probably the native race, was present with the marsh wrens and also in the sedges. Overhead swallows (*Stelgidopteryx ruficollis*) were flying about.

The marsh wrens were plentifully scattered out of sight. Flushed singly, at times almost from under foot, they flew flutteringly on an even keel low above the ground for a distance of 2 to 20 yards or more before diving into another clump, as does a Grasshopper Sparrow (*Ammodramus savannarum*), for example. In slower, almost hovering flight some of the birds kept nearly upright. In the air they revealed a conspicuous rufous brown rump, while their relatively long-tailed proportions brought to mind the ovenbird *Synallaxis brachyura*. Occasionally an individual perched atop a clump exhibited a great flicking of its wings and twitching of its cocked tail.

The note was a smooth, grasshopper-like "tzrrr" (the "r" soft) given singly more often than in two's or three's. The not particularly wrenlike song was a simple "chyip·chyip·chyip·chyip·chyip" (or "tsihp"), always, in my hearing, in five-note sets, with the notes rapid but distinct from one another, even-valued, and on the same level. Varying between sweetness and scratchiness, sometimes with a weak gargling quality or throatiness, this song sounded to me different from, and more musical than, that of birds I had heard in the United States.

Campylorhynchus zonatus (Lesson)

BANDED CACTUS WREN

RANGE: Mexico to western Ecuador.

Campylorhynchus zonatus costaricensis Berlepsch

RANGE: Costa Rica and northwestern Panama.

The Banded Cactus Wren is confined to the Caribbean slope, where it is commonly and widely distributed from the lowlands upward through the subtropical belt and, in much smaller numbers, into the lower montane belt in the central highlands and almost surely on the Talamanca Cordillera. It is also recorded

***Thryothorus modestus zeledoni* (Ridgway)**

RANGE: Eastern Nicaragua to north-western Panama.

The Pacific race, *modestus*, occurs from sea level through the subtropical belt or a bit higher. In the humid southwest it is most common along the junction of the tropical and subtropical belts, but is met regularly lower in the tropical belt. In the northwest it is scarce in the dry-forested lowlands and increases in numbers along the subtropical slopes of the continental divide. Elsewhere *modestus* is most abundant in the subtropical belt, both in the central part of the country, where it spreads across the central plateau and down to about 2000 feet on the Caribbean side, and along the Pacific face of the backbone of mountains. Specimens from the Térraba Valley and farther south approach *zeledoni* in size of bill and grayness or paleness of coloration.

The Caribbean race, *zeledoni*, which extends inland only as far as the first foothills, is virtually confined to the coastal plain. Though it does not perhaps reach the northwestern divide, which is inhabited by *modestus*, I found it common in the Río Frío region, where I had confidently expected to find *modestus*. The two races have not yet come in contact.

The Plain Wren generally occurs in somewhat separated two's, probably mated pairs. As a species, it inhabits open and semi-open country overgrown with shrubbery, thickets, matted grass, and low tangles. It is the most common nonforest-inhabiting wren after *Troglodytes musculus* and, like the latter, is almost if not entirely absent from openings within otherwise solidly forested regions. Usually the bird is very hard to see. In the very early morning, however, it may abandon thick cover to move about quickly and jerkily like a warbler or vireo in relatively plain sight amid thinner portions of viny young second growth. Also, the members of a courting pair are apt suddenly to flutter about in open view a few yards from the observer. To a far greater degree than other thicket-haunting birds, this wren is parasitized by large dipteran larvae growing in subcutaneous pockets, yet the vigor of the bird remains unimpaired.

The startlingly sudden song of this wren, known to a few people as "chinchirigüí," is quick and high-spirited but not particularly musical. Its many variations are based on a characteristic "tsit, tsit, sinsirigweé," often followed by a little chatter. Given even more commonly is a high sibilant whistle followed by a rapid "quick·quick·quick" accented on the first or last syllable. The bird also utters a rapid "chíchity work." The calls are all sharp, loud, arresting, often repeated many times without pause, and issue ventriloquially first from one side of the listener, then the other. Two birds produce this effect as each contributes a phrase slightly different in pitch from that of the other. The result is a perfect antiphonal duet matched in spirit and pattern perhaps only by the congeneric *nigricapillus*. The excitedly "courting" birds, mentioned above, sing and chitter in flight and when perched, each performing its part without an attempt at antiphony. This wren makes the usual "churr" 's and "chuck" 's as well as a buzzy "chzzz" and a hummingbird-like ticking. The songs of *modestus* and *zeledoni* sound identical to me, except that *zeledoni* gives in addition an uncharacteristic deliberate "swir swirlst," the last note rising, so to speak, in an overhanging curve. Also, *zeledoni* has a harder, heavier call note.

Thryothorus rufalbus* Lafresnaye*RUFIOUS-AND-WHITE WREN**

RANGE: Southern Mexico to Colombia and northern Venezuela.

***Thryothorus rufalbus castanonotus* (Ridgway)**

RANGE: Western Honduras to central Panama.

In Costa Rica this is a Pacific species largely confined to the northwestern quadrant. There it ranges from the more humid parts of the lowlands abundantly upward through most of the subtropical belt along the northwestern divide and decreasingly across the Pacific side of the central plateau. The distribution is not even, and local concentrations are to be met unpredictably. Elsewhere it reappears in small numbers, again in local concentrations, in the lower Térraba Valley. An old record from Angostura is perhaps erroneous if only because the bird has never again been found on the

Caribbean slope. The habitat consists largely of patches of small-leaved, relatively dry woodland, forest edges, and streamside vegetation. Along the northwestern divide, however, the bird occurs in luxuriant subtropical vegetation.

In the Pacific northwest the Rufous-and-white is present or not with the congeneric *modestus* in thickets and along edges, but the latter species is absent from woodland. It is largely sympatric with *pleurostictus*, with which, despite overlap, it strongly tends to alternate more or less in accordance with local differences in environment: *pleurostictus* at somewhat lower elevations or in drier surroundings, *rufalbus* at somewhat higher elevations or in wetter surroundings. In the Térraba region, however, its habitat seems no different from that of *modestus*.

Though relatively inactive for a wren, the Rufous-and-white acts as do many others in its genus. It is rather sedentary inside cover yet easier to see, for example, than *modestus*. Occasionally an individual shows itself fairly well up a tree in the semi-open; a breeding pair (which in a sense behave abnormally) may copulate in open view. The bird forages, as a rule, in thick growth within a yard or two of the ground. It also hops about on the ground and pokes under fallen leaves.

The hushed and gentle song, in keeping with the generally restrained demeanor, is completely different from that of any wren I know and identifies the bird sight unseen. A murmured "bawbawbawbawbaw·wínk" or "booboobooboobo·woó" or a bouncingly rolled "baw-baw-baw-bbbbbb wínk," its abruptly higher final note, whether a little "wink" or a harmonious "woo," terminates the call neatly and in perfect taste. A sound something like "oo·oo" that often precedes the call gives the impression that it belongs not to this but to a different bird. The song may be delivered once or repeated several times; if the latter, a softly musical "pít·bo" bridges the gaps. The bird makes another half dozen or so different sounds.

***Thryothorus thoracicus* Salvin**

STRIPED-BREASTED WREN

RANGE: Nicaragua to western Ecuador.

The Striped-breasted is a Caribbean wren distributed very commonly throughout the

tropical and the lower subtropical belts exclusive of the deforested central plateau. It is also present in good numbers at gaps on the Pacific slope of the Guanacaste Cordillera through which it spills from the Caribbean side; it is probably absent from the Pacific face of the Cordillera de Tilarán. The habitat lies mostly in the undergrowth of humid tall forest and includes trees and shrubbery at the forest border. The bird is present, too, in advanced second growth that adjoins or is in the vicinity of mature woodland, and occasionally it enters a well-foliaged small tree in an adjacent shaded plantation. To my surprise I found it abundant in low second-growth woods far from tall forest in the Río Frío region. It is generally not hard to see in woodland, and its ventriloquial note proves the presence of many unseen individuals.

The bird occurs in two's and family-sized groups, seldom alone. Though rather sedentary in habits, this wren may explore a tree to good heights and creep unhurriedly within an arcade of thickly tangled vines. No other wren seems to share its habitat niche. Thus, the wood wrens (*Henicorhina*) keep close to the ground, as do the solitary Nightingale Wren (*Microcerculus*) and the gregarious Song Wren (*Cyphorhinus*). As to its sympatric congeners, *nigricapillus* prefers the borders of streams, while *atrogularis* and *modestus* hardly enter forest. In the area of overlap on the northwestern divide, *rufalbus* and *pleurostictus* may occur with it to a limited extent, but here all three are at their distributional outskirts.

Certainly among its Costa Rican congeners only the Striped-breasted possesses a single whistled note. Ventriloquial, sounding something like "poop," it is often repeated at regularly spaced little intervals during which a soft "pít·bo" similar to that of *Cyphorhinus* and *T. rufalbus* may be interpolated. Its song is much like that of other fine-singing *Thryothorus* wrens and consists of a particular phrase (one of several) reiterated usually with mounting intensity. Thus, the bird repeats breathlessly a ringing short "whut-tweéhee" or "weechiwòd" or "weeteewút" or a longer "weétit titaweewóó" or "witeétee weéwoo," often complicated by extra notes. Much of the above is antiphonal, the "woo" notes being inserted metronomically by a second in-

dividual in matching rhythm to that of the repeated, isolated "poop" mentioned earlier. The bird also has several call notes.

***Thryothorus nigricapillus* Sclater**

BAY WREN

RANGE: Nicaragua to western Ecuador.

***Thryothorus nigricapillus costaricensis* (Sharpe)**

RANGE: Eastern Nicaragua to northwestern Panama.

The Bay Wren is generally abundant in the lowlands the length and breadth of the Caribbean slope, to which it is confined. It rises in small numbers to the lower subtropical belt along the central highlands, and probably along the northwestern divide and the Talamanca Cordillera, too. Though essentially a woodland species that lives in undergrowth and shrubbery along forest borders and in gallery woodland, it needs the close presence of a watercourse, apparently as a vital requirement, rather than unbroken woods, but it does occur in suitable habitat inside the forest. A lively and inquisitive bird, it is active and noisy, sometimes chasing a companion some 40 feet up through the tops of the smaller trees, even during the quiet times of day.

It is a fine singer possessing several animated songs, richly and powerfully whistled. The spirited phrases repeated several times at high speed without a break are so typical of certain other wrens, too, that I find them difficult to identify specifically. Some resemble those of the congeneric *modestus*, but are "rounder" and mellower, far more musical, and delivered even more rapidly, thus bringing to mind the allopatric *semibadius*. The Bay Wren also performs antiphonally when one bird inserts a single note at regular intervals, as does *thoracicus*, or a little gargle between the tuneful phrases supplied by its companion. A different sort of call sounds like that of *atrogularis*, but is more rapid, livelier, and repeated several times in succession. Entirely different is a "sst·sst·chuŕŕ" or "ššchchuŕŕ" or a rippling, accelerating and intensifying, crescendo-like "sssssschwôwer," of which the sibilant introductory syllables again bring *modestus* to mind. The bird also makes canary-like warbles, a soft chatter, a chatter as harsh as but sharper

than that of the tanager *Habia fuscicauda*, and several single notes. Incidentally, *T. modestus*, *atrogularis*, *thoracicus*, *nigricapillus*, and *Habia fuscicauda* can all be heard within easy earshot in many places.

***Thryothorus semibadius* Salvin**

SALVIN'S WREN

RANGE: Southwestern Costa Rica and adjacent Panama.

Salvin's Wren is sharply confined by the boundaries of the humid-forested southern half of the Pacific side of the country. An indicator species of the southwestern avifauna, it is common throughout the tropical belt and still numerous at 3000 feet in the General-Térraba-Coto Brus region, but probably does not rise above 3500 feet. I did not happen to find it farther south in the Zeledón Hump that juts into Panama. It inhabits undergrowth in and along the edges of woodland, thickety new growth and shrubbery, usually beside streams, but sometimes dry bushy thickets well away from still or running water. It is the only wren that I can recall finding in mangroves, where it was abundant. One of its common names, Riverside Wren, is by no means misapplied but could be given more justifiably to the closely allied *nigricapillus* of the Caribbean slope.

The bird is generally seen in two's or family-sized groups, also singly, but its habitat, ideally suited for dashing about in concealment, makes observation difficult. An individual sometimes exposes itself unexpectedly, and the species responds to squeaking as do wrens in general. The bird is noisy, lively, curious but wary, and very pretty. Its musically rich repertory is perhaps the largest of any Costa Rican wren. The loud ringing songs consist mostly of simple phrases warbled with spirit and repeated many times with breathless speed. Some bring to mind those of *nigricapillus* and, to a lesser degree, *modestus*. The bird also utters sweet but jumbled vireo-like phrases. Easier to recognize than the songs are certain two- or three-syllable calls. Other cries include a number of buzzy sounds, one as rough as that of an ant tanager, and cricket-like notes.

Recent cataloguers have lumped Salvin's Wren with the Bay Wren and Black-capped Wren complex (*T. nigricapillus*). In Costa

Rica *semibadius* and *nigricapillus* are so different in appearance that their common names emphasize the distinctness a conspecific designation does not. Knowing the birds in life, I readily follow Wetmore (1959a, pp. 17-18) in re-splitting them, though I cannot agree that *semibadius* "may be on its way to extinction." Its Costa Rican distribution completely fills the southwestern avifaunal zone, and the bird is abundant and apparently free from competition in its habitat niche.

***Thryothorus pleurostictus* Sclater**

BANDED WREN

RANGE: Southern Mexico to Costa Rica.

***Thryothorus pleurostictus ravus* (Ridgway)**

RANGE: Nicaragua and Costa Rica.

This member of the Central American arid Pacific avifauna is at its southern limit in northwestern, Pacific Costa Rica. It is common to extraordinarily abundant in the Tropical Dry Forest and on the lower slopes of the neighboring Guanacaste Cordillera, from which it spreads eastward in diminishing numbers to the central plateau at least as far as Grecia. It is absent from the Río Frio region, where it could reasonably be expected. An indicator species of the Guanacaste ranch country, it inhabits scrubby woodland, stream borders, and thickety ravines. It barely enters taller, wetter forest.

It occurs alone, in two's, or in family-sized groups. Although it generally keeps close to the ground in dry scrubby undergrowth, it is usually not hard to observe. Where especially abundant, it rises well up into the trees. It is not particularly shy and often exposes itself completely. An active bird, it flicks its wings continually and features a side-to-side jerking of its tail and hindquarters across an appreciable arc. Its tail, incidentally, is not carried cocked.

The Banded, in my opinion, is the best-singing Costa Rican wren. Its musical phrases, each equivalent to the full song of many other birds and just as variable, follow one another in random order. More like a finch or fine-singing thrush, this wren produces a canary-like effect by delivering a succession of richly ringing warbles and trills art-

fully separated by appropriate rests. Certain phrases bring to mind *Saltator albicollis*, others the Song Sparrow (*Melospiza melodia*) of temperate North America, others the un-wren-like calls of the congeneric *atroglaris* and *rufalbus*. Introductory or terminal portions suggest the becard *Pachyrhamphus polychopterus*, the finch *Arremonops conirostris*, and the grosbeak *Pheucticus chrysopheplus*. Diagnostic among its many other cries is a dry "picket-fence" rattle.

***Thryothorus atroglaris* Salvin**

BLACK-THROATED WREN

RANGE: Nicaragua to northwestern Panama.

The Black-throated Wren is a Caribbean species distributed from one end of the country to the other. It is common from the lowlands into the lower subtropical belt and rises locally to the upper limits of the belt. It barely spills through the gap at Lake Arenal, perhaps also at other openings, onto the Pacific side of the northwestern divide. A nonforest species, it is primarily an inhabitant of low stands of thickety or leafy new growth in the semi-open and overgrown trailsides or streamsides in the vicinity of woodland; it is not found in fields. Provided suitable habitat is present, it also occurs in largely virgin-forested areas. As a rule it keeps well hidden in dense low vegetation open to the sky, often with an admixture of emergent small trees the crowns of which have not yet formed a closed canopy. It is met alone or in two's, but its comparative abundance is made known only through its distinctive voice. Both in color and pattern it bears a similarity to an antbird, in particular the ecologically distinct *Myrmeciza exsul*, but it may occur side by side with the antbird *Cercomacra* and the congeneric *T. modestus* in thickets.

Its variable call is a strongly patterned, richly sung phrase which I transcribed as "what cheer, wáke up," sometimes followed by a chattering "choo·choo·choo·choo·choo." Usually given once, the call brings to mind the voice of the allopatric *fasciataventris*. The bird also makes a rattling sound such as is produced by running a stick along a loose picket fence.

Thryothorus fasciatoventris* Lafresnaye*BLACK-BELLIED WREN**

RANGE: Costa Rica to Colombia.

***Thryothorus fasciatoventris melanogaster*
Sharpe**

RANGE: Pacific slope of southern Costa Rica and western Panama.

The Black-bellied Wren, a southwestern species, is virtually confined to the humid tropical belt southward from the Río Grande de Tárcoles, or approximately the entrance to the Gulf of Nicoya, to Panama. Found more consistently at lower elevations than higher, it is common only in parts of the Térraba region and farther south in the lower Coto Brus Valley and the Golfo Dulce lowlands. In few places is it present in concentrations.

This nonforest-inhabiting wren should be looked for in the densest of stream-bordering thickets, wildly tangled bushy growth along borders or in cutover sites, and grouped, densely foliated low trees. Other thicket-haunting wrens occasionally show themselves in a gap. This species is glimpsed rarely, when the brightness of its white breastpiece on the unwren-like, block-patterned under parts comes as a surprise in the dark cover. Its general behavior hardly differs from that of other wrens of similar habitat, yet shows a deliberateness one associates, for example, with the antbird *Cercomacra tyrannina*.

The song consists of repeated phrases but differs from that of other wrens in its slow pace and rich dark quality, mellow as that of an oriole. Sometimes it sounds fragmented, at other times somewhat involved, but the quality remains distinctive. Throaty slurs may be inserted between phrases or placed in front of particular syllables. The bird also makes other two-syllable to several-syllable cries.

Thryothorus rutilus* Vieillot*RUFIOUS-BREASTED WREN**

RANGE: Costa Rica to Peru and Venezuela.

***Thryothorus rutilus hyperythrus*
Salvin and Godman**

RANGE: Costa Rica and Panama.

A species of the Pacific slope, the Rufous-breasted Wren has two centers of distribution in Costa Rica. The primary center is in the southwest, where it quite commonly inhabits the upper half of the tropical and lower half of the subtropical belts in the Térraba-General region. As I also found it above 4000 feet in the Cañas Gordas district beside Panama, as well as on a subtropical spur of the Talamanca Cordillera that overlooks Punta Dominical, I believe it is essentially an inhabitant of foothills and hilly terrain. At any rate, there is no report from the lower tropical belt. On the other hand it is also present in the northwest where, rare or very local, it has been recorded several times from the lowlands at the head of the Gulf of Nicoya, and also from Tenorio Volcano and the western edge of the central plateau. The possibility cannot yet be discounted that the species ranges continuously between the two centers.

The habitat consists of scrub, woodland edges, thickety second growth, and overgrown borders between clearings, but does not include more open country or forest. The bird moves about, as a rule, higher in the trees than any neighboring species of wren. It forages frequently in the upper branches of low trees where, even though the cover is less dense, its habit of searching within the foliage effectively conceals it from view. It seems specially attracted to hanging clusters of dead leaves which it examines closely and at length. One can follow the deliberately methodical rather than flitting movements of the bird, once its song or call note is learned.

Its high-speed song of the breathlessly repeated type is somewhat variable but generally recognizable, because it is usually two-phrased and keeps a set pattern. In most instances two individuals alternate in contributing a phrase. An antiphonal overlap is noticeable when one bird joins in at a slightly different pitch or enters on the same note with which the other bird ends or perhaps a little before. More distinctive than the song is a two-syllable hoarse and bubbly "chirreeez," rising in an arc and similar to the call note of the flycatcher *Myiopagis*, or a guttural "tcheetchrizz," with the second syllable rising questioningly. The bird also makes a twittering nasal chatter.

Troglodytes musculus Naumann

TROPICAL HOUSE WREN

RANGE: Southern Mexico to Tierra del Fuego.

Troglodytes musculus intermedius Cabanis

RANGE: Southern Mexico to northwestern Panama.

Troglodytes musculus inquietus Baird

RANGE: Southwestern Costa Rica and Panama.

The Tropical House Wren is nearly country-wide from sea level almost to timber line, but is absent both from extensive grassy areas and woodland. The primarily Caribbean *intermedius* is distributed commonly from the coast westward across the central plateau and upward in the central highlands, spills over in good numbers to the Pacific side of the northwestern divide, but is scarce or lacking over most of the northwestern Pacific lowlands. The Pacific *inquietus* is confined to the far southwest, from the General-Térraba region southward, in the tropical and lower half of the subtropical belts, above which it has not yet been reported. The species deserves the name "house" wren, as it occurs almost everywhere that man lives or works. It is most common in rural areas, particularly near dwellings, and is even resident in cities and towns. A pair or two can generally be found beside a small settlement in largely forested localities, sometimes at an isolated rancho, but in such places it seems to be a recent arrival.

This lively cheerful little bird with tail often cocked and pulsating is active in and around brush, stumps, cut or uprooted trunks, as well as shrubbery, hedges, and overgrown walls. Usually it keeps close to the ground; occasionally it rises high in a tree. In short-grassed open places it actually walks between the stems in the accomplished manner of a terrestrial species. It flutters against windows and screens for insects and small spiders and enters habitations and other structures, creeping like a mouse along the beams, upon which it may build its nest. Perched close by, perhaps on a ledge or on the roof, the little bird can make its song so extraordinarily loud that it rings through the house. Generally it

occurs in animated pairs, but the wary and elusive creatures are seldom seen together more than a moment.

The bird sings often during most of the year. Its song resembles that of the Northern House Wren (*T. aedon*), than which it is more musical and not so throatily gurgling. Variations include a few introductory notes followed by a trill, two trills on different levels, and a single trill sometimes preceded by a long note. It is short and fairly pleasing even when the trills sometimes rattle or chatter. The bird also makes heavy, light, and scratchy "churr" 's.

Troglodytes ochraceus Ridgway

OCHRACEOUS WREN

RANGE: Costa Rica and western Panama.

The Ochraceous Wren belongs to a complex of morphologically similar species that are at present usually lumped with *T. solstitialis*. Skutch (1940, pp. 307-308) and later I (Slud, 1958, pp. 249-250) indicated the distinctness in life between the southern Central American *ochraceus* and the northern Central American *rufociliatus*. Skutch (1960, pp. 168-169) also presented evidence in support of the separation between *ochraceus* and the Andean *solstitialis*. Todd and Carriker (1922, p. 418) considered *monticola* of Santa Marta, Colombia, "a perfectly distinct, isolated species."

The bird is best known in Costa Rica from the central highlands, where it is especially common on the Caribbean versant. It also occurs in undetermined abundance along the Talamanca Cordillera, probably its entire length. In addition, I found it common at two localities on the Cordillera de Tilarán in the northwest; it is not recorded from the Guanacaste Cordillera. Ranging from the lower subtropical belt to timber line, it is met regularly only upward from 4000 or 5000 feet. At its lower limits the species may occur locally under cloud-forested conditions. In most places it is sympatric with the congeneric *musculus*. The latter, a wide-ranging bird of considerable adaptiveness, merely extends its brush-dwelling, open-country ways to the higher elevations.

Ochraceus is primarily arboreal, and I associate it almost exclusively with the epiphyte-laden mossy trees so typical of the misty highlands and the cool wet- and rain-forested

life zones. At very high altitudes it seems to be mostly absent from unbroken virgin forest, but frequents scattered tall trees in the parklike pastures and wooded stands either thinned of undergrowth or on broken terrain. Though encountered in unshaded undergrowth, the bird is usually seen fairly high in the trees, sometimes in the crowns. It creeps and climbs in search of prey on the mossy bark, in crevices, and inside epiphytes. Flying to the base of a tree, it spurts like a little woodhewer or ovenbird up the encrusted trunk and its covering of vines, though its soft stub tail provides no support. It also descends a trunk head downward. Usually it is seen alone, sometimes in two's, occasionally in three's. This solitary little bird, walking or hopping along a vertical surface, exhibits a self-reliance that belies its defenseless appearance.

Its weak sibilant song, rambling quickly without pattern, is similar to that of its highland neighbors, the warbler *Myioborus torquatus* and the flower-piercing *Diglossa*; only vaguely does it suggest that of *musculus*. The bird also makes a prolonged, hummingbird-like, essentially single-note trill, "tseérrrrrrrr" or "tsírrrrrrt," which tapers as it descends. I recorded it also as a rather smooth, nasal lisping trill, quite unmusical, given once or several times in succession. It identifies the species as certainly as the song does not. This trill can also be short, weak, and mixed with weak scratchy mews.

***Thryorchilus browni* (Bangs)**

IRAZÚ WREN

RANGE: Costa Rica and western Panama.

***Thryorchilus browni ridgwayi* Bangs**

RANGE: Central Costa Rica.

***Thryorchilus browni basultoi* Ridgway**

RANGE: South-central Costa Rica.

The Irazú Wren inhabits the montane belt, most abundantly from a little above to a little below timber line. The race *ridgwayi* is known only from the eastern half of the Cordillera Central: the Irazú-Turrialba massif. The race *basultoi* has thus far been taken only along the northern sector of the Talamanca

Cordillera; probably it occurs on high crests southward to Panama.

The species inhabits the bushy scrub and impenetrable canelike bamboos that border the high-altitude forests, at breaks, and above the limit of trees. Though usually met singly or in two's, a number of individuals seem to be scattered over an area. This stub-tailed, white-winged little wren is active in the dense low cover; it may be silent but it is not shy. The behavior and the thickety habitat are typical of a wren. Neither the partially sympatric *Troglodytes musculus* nor *T. ochraceus* ranges to above timber line.

Its patterned song is a thin, not very clear, rather measured, wrenlike "chee·tee·wee tit tit," and so on, of which the "tit tit" portion is given deliberately. Also given is a strongly patterned, very rapid series of "tsir" 's which remind me of Khatchatourian's "Sabre Dance." Single notes include a musical "psee" and a "cheep" or "chip."

***Henicorhina leucosticta* (Cabanis)**

WHITE-BREASTED WOOD WREN

RANGE: Eastern Mexico to Peru and northwestern Brazil.

Henicorhina leucosticta tropaea

Bangs and Peters

RANGE: Guatemala to northwestern Panama.

***Henicorhina leucosticta pittieri* Cherrie**

RANGE: Southwestern Costa Rica to central Panama.

The species is distributed widely but not uniformly over the humid life zones on both slopes. The Caribbean *tropaea* is primarily a tropical-belt form common almost everywhere in woodland up to about 2500 feet. To my surprise I found it abundant in rather scrubby second-growth woodland in the Río Frío region. In some places it continues upward in apparently undiminished numbers to at least 3000 feet, becomes scarce above 3500 feet, and reaches an upper limit of perhaps 4500 feet; in other places it disappears above the 2500-foot mark. It crosses the northwestern divide to its Pacific face, where it is not uncommon in the moist subtropical belt; it does not descend to the Tropical Dry For-

est. The Pacific *pittieri* is confined to the southwest, including the Dota region. It is almost if not entirely absent from the lowlands, begins to appear locally at about 1000 feet, increases in numbers above 1500 feet or so, while at 3000–4500 feet, and probably much higher in the subtropical belt, it is abundant; it was even recorded at 7000 feet by Carriker (1910, p. 764). Upward from the lower middle altitudes, however, it gets replaced, as a rule, by *leucophrys*.

Where met regularly this species is the most common woodland wren. Usually encountered in two's or family-sized groups, it is neither solitary nor does it form bands. A sedentary bird, it perhaps passes its lifetime within the same small area. It lives almost exclusively in the undergrowth of humid forest, close to or on the ground, and spreads to contiguous shaded second growth. It is hard to see in its habitat as it melts from sight in the cover. Nevertheless the patient observer will see this active but wary bird often, because it is inquisitive, attracted by novelty, and plentiful. It hops on the ground and in brush, flits through undergrowth, and creeps along vines; it examines and probes twigs for prey. It chatters a good deal, almost continuously when disturbed, and sings most of the year. In my opinion its song does not merit the exaggerated praise bestowed by some other writers.

The variable song, generally of unhurried delivery, is a patterned set of usually three, sometimes four, full-valued whistles. The sets are separated, as a rule, by distinct pauses, though sometimes given a few times in succession. To me the call sounds rather antbird-like. The common call note is an antbird-like hoarse "eerp" or "rerp." The ordinary chatter, a finely "chitting" or "putting" trill I cannot transcribe, is characteristic, too. Both the call note and the chatter are often given, as the song is not, in the observer's presence. The bird makes a number of other cries.

***Henicorhina leucophrys* (Tschudi)**

GRAY-BREASTED WOOD WREN

RANGE: Mexico to Bolivia and Venezuela.

***Henicorhina leucophrys collina* Bangs**

RANGE: Costa Rica and western Panama.

The Gray-breasted Wood Wren is to be expected almost anywhere that cloud-forest conditions prevail, from the lower subtropical belt to timber line. It is, in general, one of the most common birds between 4000 and 7000 feet in elevation and is met regularly upward through the montane belt. Below 4000 feet it is distributed locally; below 3000 feet, only in a few isolated pockets. It seems to be most numerous on the Caribbean versant of the central highlands, is present in undetermined abundance in the Dota Mountains and along the Talamanca Cordillera, and fluctuates locally between common and scarce on the northwestern divide. Like the congeneric White-breasted, it is quite absent from the plateau region, which largely lacks suitable environment. Elsewhere it meets the White-breasted usually between 3000 and 4000 feet.

The Gray-breasted, an altitudinal replacement of the White-breasted Wood Wren, behaves as would the latter if elevated to forest-bordering thickets and brush in the cold and misty highlands. Paralleling the White-breasted, it lives in low cover close to or on the ground in woodland, but, unlike its congener, it is uncommon well inside solid forest. Again differing from the White-breasted, it may be abundant at bushy openings of the sort favored by *Troglodytes musculus*, yet is never found well away from the borders of forest. It avoids clean grassy pastures and other extensively cleared lands. It gives the impression of secretiveness, yet sometimes emerges from cover to sing or chatter close to the observer. An active bird, it constantly searches for food in the undergrowth, trash, and brush. It is generally seen in two's, also singly or in small groups of three or four.

Its song bears no resemblance to that of the White-breasted, from which it differs in phrasing, speed, much greater length, and large number of tripping notes. It consists either of a highly variable pair of rapidly repeated opposing phrases or of several different phrases given consecutively as a single lengthy utterance repeated a few times. The quality is enriched and the pattern becomes intricate when two birds sing at the same time. Immediately recognizable as that of a wren, the song is the only fine lilting one heard commonly in the middle altitudes. The

only other good one at high altitudes is that of *Thryorchilus*, which is not nearly so musical. The bird also sings more simply, but it is then difficult to identify specifically. Given commonly and persistently is a refined level chatter much like that of the White-breasted and not dissimilar to the rougher one of *Troglodytes musculus*; it is often introduced by a kissing sound. This species does not seem to possess the antbird-like call note so characteristic of the White-breasted.

***Salpinctes obsoletus* (Say)**

ROCK WREN

RANGE: Western North America to Costa Rica.

***Salpinctes obsoletus fasciatus* Salvin and Godman**

RANGE: Nicaragua and Costa Rica.

The Rock Wren reaches its southern geographic limit in northwestern Pacific Costa Rica. Here it extends southward along the bases and slopes of the Guanacaste Cordillera from Orosí to Miravalles volcanoes, where its distribution is sharply limited to the dreary grassy wastelands strewn with volcanic rocks. At Orosí it occurs on the rather flat approaches to the cone, at Rincón de la Vieja and Miravalles on the treeless portions of the steeper slopes. Though small in total numbers, it is common within the restrictions of its special habitat.

Occurring singly and in two's, this wren is usually seen only when exposed on a bare rock. Fortunately for the observer, it does this habitually in order to examine its surroundings or to sing. Either one bird sings alone or two separated individuals sing back and forth, always with raised bill. The bird holds firmly to the bare rock even when buffeted by the high winds that prevail during a good part of the year. It progresses afoot with short rapid hops which hardly lift its body or with longer, leaping ones. Its line of flight is steady but fluttering, without dips or glides, close to the ground, and not long sustained. Sometimes a bird flutters or hovers higher in the air, but it does this perhaps only during courtship. Its most notable mannerism is the dipping of the head and body, but not of the downwardly directed tail, rapidly up and down, as though performing shallow knee bends.

The rather unmusical weak song is made up of simple level phrases. These phrases, each the equivalent of a call, consist of a single note in repetition as a steady trill or rattling warble. Of several kinds, they differ in pitch and pace, follow one another in no particular order, and are separated by well-marked pauses. An agreeable effect is produced by the very unpredictability of the sequence. Indeed, the song may even sound accomplished amid the desolate surroundings. One of the phrases is a spiraled unclear "weeza weeza weeza weeza" remarkably like that of the antbird *Hylophylax naevioides*. The call note is a rather musical "cherweé."

***Microcerculus marginatus* (Sclater)**

NIGHTINGALE WREN

RANGE: Southern Mexico to Bolivia and northern Brazil.

***Microcerculus marginatus philomela* (Salvin)**

RANGE: Southern Mexico to eastern Panama.

The Nightingale Wren lives mostly in tall humid woodland, thus excluding the Tropical Dry Forest, from sea level to altitudes far above those of the central plateau. In the lower tropical belt it is common in the very humid sectors, as the Sixaola region in the southeast, the Golfo Dulce region in the southwest, and the Sarapiquí region in the northeast, in all of which it is associated with foothills or their fringing lowlands. In the subtropical belt it is common along the Guanacaste Cordillera in the northwest (where it is found down to 800 feet at El Pelón) and very common to abundant along portions of the Pacific slope of the Talamanca Cordillera, probably also on its Caribbean slope. A solitary bird, it dwells in thick brushy cover on the forest floor, sometimes right to the forest border or even beyond it in thickets and wild scrubby growth. For the most part it is rarely seen even where heard often. It has the habit of teetering its hindquarters like a Spotted Sandpiper (*Actitis macularia*) and in general is a very peculiar wren. I know of no observations on its nesting, hence report that I saw a bird carrying food in its bill on February 17 in the southwest.

In Costa Rica the bird utters two very

striking, unwren-like songs that are completely different from each other. One consists of a long series of successively lower-pitched whistled notes separated from one another by long pauses. The other is a leisurely rambling affair that alternately rises and falls in an arresting manner. I suggested on the basis of song that there may be two species of nightingale wren in Central America (Slud, 1958). Blake (1958, p. 548) suggested the same possibility on the basis of plumage differences that correlate with geographical distribution.

***Cyphorhinus phaeocephalus* Sclater**

SONG WREN

RANGE: Honduras to western Ecuador.

***Cyphorhinus phaeocephalus infuscatus* Zimmer**

RANGE: Costa Rica and northwestern Panama.

The Song Wren is a Caribbean species distributed the length of the country, primarily in the tropical belt. Occasionally it is found higher on slopes and ridges in the lower subtropical belt, including overlap of the Pacific versant of the northwestern divide north from the gap between the Guanacaste and Tilarán cordilleras. A single report from northern Guanacaste near Orosí Volcano probably applies to a local finger-like extension of the humid Caribbean climatic influence.

This is a forest-inhabiting wren that enters the shade of adjoining tall second growth and sometimes thickety vegetation. Semiterrestrial, seldom flying, it keeps low in the understory or hops on the ground. Although wary, it is not particularly shy. It occurs as a rule in small bands that travel about as a self-contained unit; occasionally it is met singly. It is often found, too, in temporary association with other kinds of small birds of the undergrowth.

This peculiar wren reminds me of a semiterrestrial antbird because of its odd sounds, flat-headed profile, thickened beak, bare facial skin, short and fairly broad tail, and occasional attendance on army ants. Perched, it may exhibit an exaggerated up-and-down nodding of the anterior part of its body with its head held alertly high. On the ground it habitually pries up the edges of fallen

leaves and peers underneath for animal prey. Disturbed, it stretches up straight and cranes its neck to look around in a ludicrous manner. Possibly individuals of this gregarious species breed throughout the year. At any rate, I have seen what appeared to be paired adults alone with a fluttering helpless fledgling the last week in November.

The bird advertises its presence by reiterating guttural resonant phrases which I transcribed as "kwókawok," and so on, and "puppupkrék," and so on, as well as a throaty chatter sounding at times like water soaking into the ground. A "kyou" followed by a higher-pitched whistle may be interpolated among the "kwókawok" 's. Or two melodious whistles, on the same level or not, may be superimposed on the guttural undercurrent. Similarly, one bird may whistle several high-pitched "peep" 's; another bird, lower-pitched "poop" 's (or "püp" 's). An interesting variant sounds like "weé, pt bò," (the "bò" whistled).

FAMILY MIMIDAE

***Dumetella carolinensis* (Linnaeus)**

COMMON CATBIRD

RANGE: Breeds in North America; winters south to central Panama and in West Indies; recorded in Colombia.

The migrant North American catbird is an uncommon transient and winter visitant in Costa Rica. It begins to arrive in early September but is usually not encountered until the latter part of October, when later arrivals increase the numbers of the bird and the chances of seeing it; individuals remain until the first week of May. It seems to be virtually restricted to the humid Caribbean side of the country, and I met it under the same climatic influences at Miravalles on the Pacific face of the Guanacaste Cordillera. It keeps mostly to the tropical belt, occasionally higher on the Caribbean side of the central plateau.

Usually individuals are scattered widely apart and are seen singly. Though the species is met only occasionally, a wintering bird can be rediscovered at a particular site in which it settles for weeks, perhaps months. It keeps concealed low in dense thickets, overgrown borders, and impenetrable wild shrubbery in the semi-open, but may expose itself very

early in the morning, when it appears alert and watchful as it flicks its long, usually cocked tail, and also its wings. Twice I happened to see it in small bands in 10-foot thickets mixed with emergent trees. Here the birds rose into the trees, even to the tops of fairly tall ones, clinging to foliage, stretching their necks to reach food, behaving all in all like a mixture of arboreal tanager and *Myiarchus* flycatcher. The only sound I have heard is its characteristic harsh mew.

[*Mimus gilvus* (Vieillot)]

TROPICAL MOCKINGBIRD

RANGE: Southern Mexico to Honduras; Panama Canal Zone; Colombia to southeastern Brazil; Lesser Antilles.

The immature bird in the Berlin Museum, taken by Hoffmann and reported by Cabanis [1860 (1860–1862, 1869, vol. 8), p. 410], must be struck from the Costa Rican list because its provenance was Guatemala (Frantz, 1869, p. 290). The only supposedly authentic Costa Rican specimen (M.N.C.R. No. 893), which belongs to the race *melanopterus* of northern South America, is the one taken by José Zeledón near El Zarcero at an altitude of 7000 feet (undoubtedly on the slope of Poás Volcano) in 1887. That such a striking open-country species should not ever again have been reported makes it almost certain that this was an escaped cage bird. I believe the species should be removed even from the hypothetical list.]

FAMILY TURDIDAE

***Turdus albicollis* Vieillot**

WHITE-THROATED ROBIN

RANGE: Mexico to Bolivia and extreme northeastern Argentina.

***Turdus albicollis oblitus* Miller and Griscom**

RANGE: Costa Rica (except southwest).

***Turdus albicollis cnephusus* (Bangs)**

RANGE: Southwestern Costa Rica and western Panama.

The southwestern race, *cnephusus*, is confined largely to the General-Térraba-Cañas Gordas sector, but apparently typical individuals also occur in the Dota Mountains and even in the central plateau region. Specimens

of the race *oblitus* in the rest of the country approach *cnephusus* on the one hand and the Nicaraguan *atrocinctus* on the other hand, so that most Costa Rican specimens, excluding the southwest, are variously intermediate.

The White-throated Robin is primarily an inhabitant of the subtropical belt, from which it rises to at least 6000 feet in the lower montane belt. It is common to abundant on the Pacific face of the northwestern divide, in the vicinity of Boruca and along the slopes of the Talamanca Cordillera in the southwest all the way to Panama, and in the mountains to the south of San José. Its numbers are greatly reduced in the tropical belt of either slope. It is rare in the lowlands but becomes more frequent with increasing elevation in the foothills.

Though essentially an inhabitant of forest, it occurs, rather surprisingly, in fair numbers in the scrub-choked narrow ravines dissecting the deforested western face of Miravalles Volcano and the grassy, bushy, bracken-covered "savannas" that overlook the Térraba-Coto Brus valleys. It is seen alone, in two's, and in concentrations of somewhat separated individuals, usually below medium heights in the trees or fairly high in the understory. The bird is shy and makes good use of the forest cover; it may be completely concealed even at close range. In the "savanna" habitat, mentioned above, this arboreal species is often found on or near the ground.

The bird would often pass unnoticed if not for its note, an "ep," "ek," or "ok" similar to that of *Tityra semifasciata* but not doubled or nearly so piglike. Another odd note, a throatily metallic "ooéék," may be given dutifully, often repeatedly, as though that were the order of business on hand, by any of the members of a quietly seated company. It is quite unusual to see thrushes sitting about, incongruous in this elusive species which acts this way mostly in the southwest.

If we exclude the solitaire *Myadestes ralloides*, this species is the most gifted and versatile singer among the Costa Rican thrushes. Many-parted, the fine song consists of lively phrases that follow one another in refreshingly unpredictable order; it might be attributed to a wren, such as *Thryothorus pleurostictus*, rather than a thrush. The bird also has a typically robin-like song (e.g.,

Turdus grayi). Several other sounds, almost all of which are heard far more frequently than the songs, are also given.

***Turdus grayi* Bonaparte**

GRAY'S ROBIN

RANGE: Mexico to northern Colombia.

***Turdus grayi casius* (Bonaparte)**

RANGE: Costa Rica to Panama and adjacent Caribbean Colombia.

Gray's Robin is found over most of the republic from sea level nearly to timber line. As it may readily be seen or heard where most people are likely to go and occurs in nearly all places where people are already living, it is not surprising that everybody knows the bird. Evidently preferring semi-open country, the species is conspicuously abundant in cultivated areas, such as the coffee fincas on the central plateau. Though occasionally it may turn up fairly well inside woodland, it is in effect absent from extensive tracts of virgin forest on the Caribbean slope and in the southwestern sector. Its status in the relatively dry-forested Pacific northwest ranges from lacking to scarce, sparse, or locally uncommon. Vertically, the species decreases rapidly in numbers above the subtropical belt, until it is almost completely replaced in the higher parts of its range by *T. plebejus*.

Its mannerisms are typically those of *Turdus*, particularly the one of always twitching the tail a few moments when alighting on a perch. This invariable custom, together with the characteristic stiff posture, proclaims "robin." The bird on the ground spurts in short hops mixed with tiny steps, but this species is less terrestrial than, for example, the common robin (*T. migratorius*) of the United States. Another trait is the head-long dash into a thicket or across a highway into roadside vegetation. Its nest is often placed virtually in the midst of habitations, where the boldness of the mother, masked by a secrecy of approach that fools nobody, coming to feed the baby birds may arouse the observer's sympathetic interest.

The rather pleasant song is very similar to but smoother or less fragmented and, to my ear, mellower than that of the North American *migratorius*. It is highly esteemed by Costa Ricans, who seek the "yigüirro" as a

cage bird. This seems an unnecessary practice, as free-living birds sing almost all day long even inside the city of San José. The common call note, a long, upwardly inflected mew, is perhaps sweeter and more plaintive than the similar one of *migratorius* and not unlike that of a hypothetically large-lunged pewee (i.e., *Contopus virens*). The bird also makes the typical cackle of a robin, a nuthatch-like nasal "ung-ung-ung," a high-pitched, thin "sip," dull sibilant "sreer" 's, an "uck uck" deeper than that of *plebejus*, a doubled, "pulley"-like note, and other sounds.

***Turdus fumigatus* Lichtenstein**

PALE-VENTED ROBIN

RANGE: Costa Rica to Bolivia and southeastern Brazil; Lesser Antilles and Trinidad.

***Turdus fumigatus obsoletus* Lawrence**

RANGE: Costa Rica to Panama and adjacent Colombia.

The Pale-vented Robin is a Caribbean species found primarily in the foothills. From the western slope of Poás Volcano it follows the northern face of the Cordillera Central and, swinging around Turrialba Volcano to the Reventazón watershed, touches the eastern and southern edges of the plateau region. Presumably it continues onward to Panama, as I found it also on the approach to Cerro Chirripó, though it has not yet been recorded from the Talamanca Cordillera proper. There is no report from the northwestern divide. Vertically its probable breeding range extends from the upper half of the tropical through the subtropical and, in places, well into the lower montane belts. The species is not seen often but appears to be least uncommon at a mean elevation of 3000 feet. There are a few records from the lower tropical belt, including one at sea level, where the bird is a rare to locally fairly common nonbreeding visitant.

This robin evidently prefers forested regions, as it generally occurs at or fairly well behind the forest border, but apparently not in the interior of solid forest; it enters openings with tall trees in and beside woodland. It is usually seen fairly high in the trees, also downward to the upper understory and, at times, rather low in the understory. The

bird is met often in small bands, also singly outside the breeding season. A group forages actively as it troops about, or, relatively inactive in the canopy, say, of medium-sized trees, the members individually shift position and flutter around and about. Usually they are hard to observe in the leafy cover overhead. This robin, incidentally, does not habitually flick its tail.

Its song is very much like that of *grayi*, but more rapid, with hardly any pauses, and often interpolated by a rapid "weeooweét," not particularly distinctive in itself, and a sound something like "oowhéeur" that brings to mind a distant hawk-eagle (*Spizaetus*) or Prince Hawk (*Leucopternis princeps*) as well as several flycatchers. (*Turdus grayi*, by the way, occasionally inserts a note similar to the last in its song.) Also given are a squeaky, rather harsh, rising "weep," sometimes repeated many times, and a short throaty "wock," "rock," or "rirk." Immature birds make weak, parrot-like sounds often continued at length.

***Turdus plebejus* Cabanis**

MOUNTAIN ROBIN

RANGE: Southern Mexico to western Panama.

***Turdus plebejus plebejus* Cabanis**

RANGE: Costa Rica and western Panama.

This robin inhabits the mountainous interior, from altitudes mostly above those of the central plateau to timber line. It is abundant in the central highlands and present along the Guanacaste and Tilarán cordilleras as well as the Talamanca Range. In most places it descends, apparently seasonally, close to the lower limits of the subtropical belt. Primarily an inhabitant of open woodland, it also occurs along woodland edges, in patches of forest, tree-scattered small clearings, and parklike pastures at the high altitudes. Greatly outnumbered by *grayi* in the lower portions of its range, it almost completely replaces the latter in the upper middle altitudes. Above 8000 feet it is again surpassed in numbers, this time by the montane-belt *nigrescens*.

The Mountain Robin is seen singly and in loosely flocking small groups. Though found in low trees and thickets and not uncommonly

on the ground, it is an arboreal species that usually stays well up in the trees, foraging mostly for berries. An active bird, sometimes unusually wary and hard to observe, it may flee the observer without apparent provocation, either hiding in the upper foliage or flying headlong to settle behind cover some distance off. Its posture and proportions are typically those of *Turdus*, but the tendency to flick its tail upon alighting is not pronounced.

Bringing to mind some small bird rather than a large robin, its variable song is generally not musical. At its best it continues for a while as a chirking singsong difficult to identify when speedy. The individual notes resemble those, for example, of the hummingbird *Phaethornis guy*, and the pattern is vaguely reminiscent of the "tick-tock" of the tanager *Habia fuscicauda*. Other sounds are given much more frequently than the song and are typically robin-like, including a disturbed-sounding cackle which is often the key to the presence of the bird.

***Turdus nigrescens* Cabanis**

SOOTY ROBIN

RANGE: Costa Rica and western Panama.

This "black" robin is an indicator of the montane belt to which it is largely confined and from which it extends downward in diminishing numbers only into the upper lower-montane belt. It is abundant in the parklike pastures below and the scrub above timber line on the Cordillera Central and is present in unreported frequency on the high mountains bordering the southern edge of the central plateau. It is very common, at least in the northern sector, on the high Talamanca Cordillera, along the crest of which it almost surely continues southward to Panama.

The bird is partly arboreal and largely terrestrial. It rises regularly to the lower branches, sometimes to the tip of a tall stub or very high in the trees, usually in order to sing. Afoot it hops and stops like a typical attitudinized robin, often standing very erect. Upon alighting, even on the ground, the bird always twitches its tail. It flies as a rule swiftly and low. Except when shooting downslope, its flight is not so much hurtling as an intermittently propelled, speedy glide.

Poor for a *Turdus*, this robin conforms

vocally to the unmusical standard of birds in general at very high altitudes in Costa Rica. It sings, so it would appear, only during the breeding season. The song consists of several vireo-like "squirky" phrases linked robin-like in no set sequence. The individual phrases are very short, hardly more than two-part chirps, inflected up or down. A chirping trill and formlessly reiterated squeaky chirps are perhaps also confined to the breeding season. Given commonly the year round is a "chrr·chrr·chrr·chrr" that is smoothly wren-like or harshly swallow-like. The bird also makes an unclear chirp as well as the "sss" of a robin.

***Myadestes ralloides* (d'Orbigny)**

ANDEAN SOLITAIRE

RANGE: Costa Rica to Bolivia and northern Venezuela.

***Myadestes ralloides melanops* Salvin**

RANGE: Costa Rica and western Panama.

The Andean Solitaire inhabits the mountainous interior from about 2500 feet in the subtropical belt to 7000 feet in the lower montane belt. It is most abundant, in general, between 3000 and 5000 feet in the lower middle altitudes, almost exclusively in cool wet-forested areas. It is most common on the central Caribbean slope, where it has even been found in upper tropical-belt wet forest along the northeastern base of the Cordillera Central. In apparently smaller numbers it is present along the Talamanca Cordillera in the southwest; it undoubtedly occurs along both slopes into Panama. It is also present, either sparingly or locally, along the humid northwestern divide.

Usually the bird is recorded by ear in sparsely inhabited regions, such as broken country where a few trails perhaps follow the crests of wooded ridges. The disembodied song hanging in the air like an echo, its struck-crystal timbre harmonizing with the chill surroundings, is almost impossible to trace. Nevertheless the bird is to be seen from time to time, though rarely while singing, from high in the trees to low in shrubbery or the understory, almost always alone. It may remain sluggishly quiescent for a good while or hop along a branch or from one limb to another before coming to a motionless stop.

It takes small fruits in the manner of either a flitting, neck-stretching tanager or a hovering trogon. Once I even found a bird in a thicket above swarming army ants. Despite its different appearance and proportions, its behavior and attitudes suggest a semi-terrestrial thrush become adapted to arboreal life.

Stressing virgin clarity of tone instead of vocal pyrotechnics, this solitaire is surely one of the most refined singers of this or any country. Its song has reached a substance-shedding extreme to which the nightingale thrushes and *Hylocichla* thrushes, so to speak, aspire. Here in Costa Rica it is simply an "eeohlay" phrase of which the two to several syllables, each of pristine pitch-pipeline purity, are given at different levels. Successive utterances may vary somewhat or not, while certain individuals repeat a recognizable pattern. Sometimes a particularly gifted bird couples opposing phrases, the first trending downward, the second upward, worthy of a theme in symphonic music. Also given is a musically cloaked, throaty clang, "rraou." The female sings, too, but not nearly so well as the male.

***Hylocichla mustelina* (Gmelin)**

WOOD THRUSH

RANGE: Breeds in eastern North America; winters from southern Texas to Panama.

In Costa Rica, close to the southern limit of its winter range, the Wood Thrush occurs as a visitant in relatively small numbers, but not so small as its rarity in collections suggests. Apparently the bird does not arrive until October and leaves mostly in March, though still met the first part of April. Here it is largely confined to humid forest, mostly in the hilly upper tropical and lower subtropical belts. It shows up regularly along the Pacific bases of Tenorio and Miravalles volcanoes, less regularly in the Caribbean foothills. It is also present in the winter, at least locally, in the northeastern lowlands and has been taken in the lower Térraba Valley in the southwest. Probably it occurs along the wooded lower slopes on both sides of the Talamanca Cordillera. In addition, I saw a fall migrant in a public park in San José on the central plateau. It is not known from the Tropical Dry Forest.

The wintering Wood Thrush stays close to or on the ground in the forest understory and the lower branches of trees. It occurs, too, in thickety growth along streambanks that adjoin solid woodland. It is seen singly and in small groups of two to several individuals. Wary and generally hard to see well, the birds exhibit the same nervous, high flicking of the wings as the congeneric *ustulata*, spring into flight at the slightest provocation, and hide behind a screen of foliage. The members of a group show a limited interdependence. The alarm of one bird communicates itself to the others, whereupon they all scatter. During part of their winter stay the birds can be counted on to remain at a certain spot in the woods. Onward from January or February they either actually or, because they have become silent, apparently decrease in numbers. I have not heard the Wood Thrush sing in Costa Rica, but it frequently utters its three-syllable, alarmed-sounding cry, a rapid energetic "quick·quick·quick" or "quack·quack·quack," and sometimes a four- or five-note mechanical sort of nasal rattle.

***Hylocichla ustulata* (Nuttall)**

SWAINSON'S THRUSH

RANGE: Breeds in North America; winters from Mexico to Bolivia and Argentina, also in West Indies.

***Hylocichla ustulata swainsoni* (Tschudi)**

RANGE: Breeds in North America (except Pacific slope); winters from southern Mexico to Bolivia and northwestern Argentina.

Swainson's Thrush is an abundant passage migrant in the spring and fall but a rather uncommon, though not rare, winter visitant. It first appears in the latter part of September and becomes common in October. It is again seen in transience from the latter part of April to as late as the third week of May. It is occasional in the highlands, sometimes close to timber line, but is apt to show up in good numbers in all sorts of surroundings almost anywhere else. Mostly, however, it is met in open or selectively logged woodland, in and about wooded patches, shaded plantations, and riverside thickets, from well up in the trees down to the upper understory or

close to the ground in jungle cover. It does not appear to winter in extensively forested regions.

Its behavior which parallels its wide choice of habitat is difficult to characterize. The bird does show a preference for trees, though not in clear contrast to the other *Hylocichla* thrushes, which are largely semiterrestrial. It may settle in tree-arcaded foliage along streams or descend low in dry thickets. Though often occurring in loosely dispersed groups, it is also met singly. A small flock may flit almost as actively as warblers high in the trees, yet be just as active considerably lower. The bird flutters and hovers to snatch berries from the foliage in trees or hops on the ground in search of live prey. I have also seen it attending army ants.

In carriage, bodily proportions, and some of its mannerisms it is at times rather robin-like (*Turdus*). Its swift and dashing flight terminates in a sudden postured halt. Though the bird does not flick its wings and tail automatically upon alighting, as do robins it does so a moment or two later. Or, standing at attention on a perch, it stiffly twitches its tail from time to time. The bird is generally hard to see whether in groups or alone. Even at a distance it seems to sense the observer's presence and conceals itself uncannily behind a branch or foliage directly in the line of sight.

This migrant thrush generally gives the impression of voicelessness. Its weak note, a quick, soft and watery "pwink," "pwk," "pwit," or "whit," usually accompanied by a flick of the wings, is almost indistinguishable from that of the migrant flycatcher *Empidonax traillii* or the manakin *Chiroxiphia linearis*. The bird begins to sing in recognizable fashion by the end of April. The song is delivered rapidly, rises in two or three stages, and terminates in a high, weak, warbling trill like that of *guttata* or *mustelina* in the United States. The variations, all rising spirally, are difficult to transcribe.

***Hylocichla minima* (Lafresnaye)**

GRAY-CHEEKED THRUSH

RANGE: Breeds in Canada, northeastern Siberia, and northeastern United States; winters chiefly in northern South America.

Hylocichla minima minima (Lafresnaye)

RANGE: Breeds in Canada (except southeastern sector) and northeastern Siberia; winters chiefly from Colombia to Peru and northern Brazil.

The status of the Gray-cheeked Thrush in Costa Rica is that of a very uncommon fall transient and rare winter visitant; its date of departure in the spring is not known. I found it in migration twice, both times in October, singly in the northeastern lowlands and as a unit of several scattered individuals associating intimately with a migratory wave of *ustulata* in the southeastern corner of the country. It has also been recorded from the central plateau, the northern base of the Cordillera Central, and the tip of the Nicoya Peninsula, in late October and early November. I found it in winter only twice, both times singly, in the Térraba region of the southwest.

Most of the birds I observed, especially the visitants, favored similar environments: thickety cover along shallow streamlets or densely tangled swampy dips. Some of the transients were in brush-covered, log-strewn, relatively open portions of woodland or in shrubs in a tree-scattered clearing with breast-high ground cover. Almost every individual kept below shrub height, close to or on the ground, and its actions seemed not to differ from those of the versatile *ustulata* in similar circumstances. In Costa Rica the species can be considered voiceless for all practical purposes. It makes at most a flycatcher-like little "wheesp," quite unrecognizable specifically yet different from the note of *ustulata*.

Hylocichla fuscescens (Stephens)

VEERY

RANGE: Breeds in North America; winters in south America.

Hylocichla fuscescens fuscescens (Stephens)

RANGE: Breeds in eastern North America; winters from Colombia to British Guiana and south-central Brazil.

The Veery, migrating mostly through the Antilles and the Caribbean Sea, occurs in Costa Rica as a very rare transient. It is known from the Caribbean slope, where I met it once in the subtropical belt and once

in the coastal lowlands. In addition, there is an old record from the central plateau (San José). Thus far it has been found only in October.

The first bird I encountered several times during two successive days beside a muddy trail passing through a patch of untouched woodland on a wet-forested 3000-foot ridge. It generally flushed from the ground, where it had been hopping about like a nightingale thrush, to a low branch on which it stood motionless. It flew a little distance only when approached closely. I saw what may have been the same individual also resting quietly low in the trees. My second observation was made a few hundred yards from a coastal palm swamp in the extreme southeast. This bird was with a mixed group of *ustulata* and *minima*, also on the ground and just above it in thickety second growth through which passed a number of nearly hidden slow-flowing streamlets. The semiterrestrial behavior would appear to characterize the species in migration in Costa Rica just as it does, say, in northeastern United States. Neither of the above birds made a sound.

Catharus mexicanus (Bonaparte)

BLACK-HEADED NIGHTINGALE THRUSH

RANGE: Northeastern Mexico to western Panama.

Catharus mexicanus fumosus Ridgway

RANGE: Nicaragua to western Panama.

The Black-headed Nightingale Thrush, a Caribbean species, inhabits the foothills and slopes of the Cordillera Central from somewhat below 1000 feet in altitude to perhaps 5000 feet, or nearly to the lower montane belt, with its center of abundance between 2000 and 3000 feet in the lower subtropical belt. It also occurs under similar climatic conditions on both slopes of the forested northwestern divide. Though not recorded from the Talamanca Cordillera other than its northeastern approach, the species is probably distributed continuously along the Caribbean side to Panama. It is primarily an inhabitant of wet forest, but also occurs in patches of woodland, shaded second growth, and sometimes ventures a bit into selectively cutover openings.

This species and the congeneric *fuscater* are

much alike in appearance and actions and, occupying the same sort of habitat, can literally be found side by side in their broad range of geographic overlap. Together they form a well-defined species pair separable from the other three Costa Rican nightingale thrushes not only in appearance but also in their ecology. Generally keeping low in the forest undergrowth, on a log, or on the ground, they are almost always met singly. They progress usually in series of quick hops, then come to a sudden halt and stand at attention. Flying low and not far, the birds disappear almost immediately in low cover. Unless come upon accidentally or when not disposed to flee, they can be difficult to find and see in the dark understory. Both species are sedentary, and a particular individual can be counted upon to call from the same spot in the forest. They sing at almost any time of day, although *mexicanus* is less apt to do so than *fuscater*. Their songs are distinctly different from one another.

The variable song of *mexicanus* usually consists of one or two short phrases with an extra note or two at the beginning or end. The quality is that of a fuzzy, slurred, or skewy flute. Some notes sound like wavering warbles suggestive of the genus *Hylocichla*; others are sharp. A slurred sharp "sreek" in some phrases helps identify the singer. Also given are a quick dry trill or rattle, like stones being knocked together, a very soft, unclear "pseer," an antbird-like "grrr" and "meww," and a plaintive slow "chowr," rising somewhat.

***Catharus fuscater* (Lafresnaye)**

BLACK-BACKED NIGHTINGALE THRUSH

RANGE: Costa Rica to Bolivia and western Venezuela.

***Catharus fuscater hellmayri* Berlepsch**

RANGE: Costa Rica and western Panama.

The Black-backed Nightingale Thrush is found along the interior foothills and mountains on both slopes. It is most common on the Caribbean versant of the Cordillera Central, common to abundant along the Guanacaste and Tilarán cordilleras, and present in undetermined frequency in the Dota Mountains and probably in large numbers along the Talamanca Cordillera. Vertically

it ranges from slightly below the lower limits of the subtropical belt up to 6000 feet or more, with its center of abundance in the upper subtropical and lower lower-montane belts. Yet it seems to be almost as common at 3000 feet, where it is sympatric with *mexicanus*, as a couple of thousand feet higher, where *mexicanus* has mostly dropped out.

This species is virtually identical to *mexicanus* in habits and choice of habitat. Although superficially similar in appearance, the two have marked plumage differences. In life, moreover, the white eye of *fuscater*, encircled by a weak ochre eye ring, seems small in size; *mexicanus* has a conspicuously sharp orange eye ring encircling a black eye, which appears large and staring. *Fuscater* has a flat crown; *mexicanus*, a "derby"-like domed crown.

Fuscater is perhaps a more elusive bird than *mexicanus*. Its catlike mew may be given close at hand yet be almost hopeless to trace. Still, the bird sometimes shows itself in plain sight, standing on or clinging to a twig, posing straight and stiff, with raised bill and uptilted head, and legs spread well apart, the bright toes looking like orange gloves clasping the perch. Despite the immobility of the bird, its lightning flicks of the wings attract attention.

Its usual song has the quality of a clear flute instead of the fuzziness of that of *mexicanus*, and the notes are given individually rather than warbled waveringly. Usually it has a distinct, consistently recognizable, two-part pattern for which I have substituted the words: "one t·wo, threé to·two" or "one t·threé, threé t·one." The pattern may be lost when the first part is given normally but the second thinly trilled, or when only a single phrase is uttered. Some individuals sing a polished song that approaches the quality and purity one associates with the solitaire *Myadestes ralloides*: "eéay eeooleéee." In general, the song does not show the resemblance in phrasing and quality to a *Hylocichla* as does that of other nightingale thrushes. The bird also gives a fuzzy, elania-like "whéwty wheer." Its call note, a rising "maow" or "myaaa," is probably the most catlike of the mews given by several other birds in the country.

Catharus frantzii Cabanis

FRANTZIUS' NIGHTINGALE THRUSH

RANGE: Central Mexico to western Panama.

Catharus frantzii frantzii Cabanis

RANGE: Costa Rica and western Panama.

The species is distributed through the cloud-forested highlands in the central and southern parts of the country, but is absent, so far as known, from the Guanacaste and Tilarán cordilleras in the northwest. It is most abundant on the Cordillera Central, apparently uncommon in the Dota Mountains and along the Talamanca Cordillera. Vertically it ranges from the upper limits of the subtropical belt to the lower portion of the montane belt. Its center of abundance in the lower montane belt is below that of *gracilirostris*, above that of *aurantiiostris*, and averages higher than that of *fuscater*.

Frantzius' Nightingale Thrush is seen singly, as a rule, almost always on or just above the ground. It prefers forested areas in which it frequents densely undergrown borders and wooded ravines choked with low vegetation, but is usually met along the edges of the parklike highland pastures and of overgrown clearings. Occasionally it shows itself in adjacent exposed situations of the sort favored by *gracilirostris*, though it is a much warier bird than the latter. Afoot it progresses in robin-like bouncing hops, as do the other nightingale thrushes; I have not seen it walk. A bird preparing to hop or to fly signals its intention by pulling down its head and spreading its wings as if it were lifting a skirt. In its usual pose the bird holds its wings lower than the tail, raises the tail and flicks its wings a few times, slowly relaxes the tail to its normal position, then it may repeat the sequence several times. Abruptly picking food from the ground, the stiffly postured bird bends rapidly down and up like a seesaw with its legs as the fulcrum.

I did not learn to distinguish the song of Frantzius' from that of its congeneric highland neighbor, *gracilirostris*. It also consists of one to three "eeoolay" phrases, flutelike but not clear, first up, then down, followed perhaps by a much higher-pitched concluding phrase, such as that of the North American

Hermit Thrush (*Hylocichla guttata*). Specifically diagnostic among the members of its genus is its slightly rising, mellow whistle, often repeated after short pauses; sometimes this questioning note is guttural and hoarse. The bird also makes a froglike rising "rreërk" or a hoarse "woërk."

Catharus aurantiirostris (Hartlaub)

ORANGE-BILLED NIGHTINGALE THRUSH

RANGE: Southern Mexico to Colombia and Venezuela; Trinidad.

Catharus aurantiirostris costaricensis Hellmayr

RANGE: Nicaragua to central Costa Rica.

Catharus aurantiirostris bathoica

Bangs and Griscom

RANGE: Nicoya Peninsula, Costa Rica.

Catharus aurantiirostris russatus Griscom

RANGE: Southwestern Costa Rica and western Panama.

The race *costaricensis* is primarily an inhabitant of the central highlands between the extreme limits of 2000 and 7500 feet above sea level, with its center of abundance between 3000 and 5000 feet. From the plateau region and the contiguous mountain slopes it extends eastward in diminishing numbers to the upper Reventazón Valley and Turrialba Volcano, northward through the gap between Barba and Irazú volcanoes down to Carrillo, and westward at least as far as Grecia. Probably it continues northwestward uninterruptedly along the Cordillera de Tilarán, where I found it abundant at Monteverde, toward Lake Arenal; there is no report from the Guanacaste Cordillera to the north or the Dota Mountains farther south. An isolated population in the Nicoya Peninsula, the weakly marked *bathoica*, was discovered some 30 years ago by Austin Smith. It is still known only from the type locality (Hoja Ancha) in hilly terrain of the Tropical Dry Forest. The race *russatus*, a member of the *griseiceps* group formerly accorded specific rank, occurs in the far southwest. There, mostly in the General-Térraba region but also into Panama, it inhabits the upper tropical and lower subtropical belts along slopes and spurs of the Talamanca Cordil-

lera. Its upper limit is approximately that reached by the influx of forest-cutting settlers, who are no doubt expanding its preferred environment.

This species is not forest-based as is, for example, the partially sympatric *C. frantzii* of similar appearance. It is found principally in scrubby low growth, borders of secondary woodland, roadside thickets, tangled shrubbery and brush on slopes and in ravines, with but slight penetration into woodland. But where *costaricensis* is especially abundant, it occurs regularly behind the edges in jungly or virgin-wooded areas, and it may rise to big limbs some 50 feet up. The southwestern *russatus*, even more markedly than is usual in *costaricensis*, hides like a wren in thickety growth and roadside hedges. The species is retiring in disposition, hard to see, and capable of slipping away like a shadow. It is occasionally surprised on the ground in the open a little way from cover or on a trail that passes through tangled low growth, hopping springily and posturing stiffly as do thrushes in general. Singing from concealment while standing long-leggedly immobile on a perch, perhaps one bird in 10 can be located and observed. Once found the bird does not appear unduly timid.

The song is quite poor and unmusical for a *Catharus*. Consisting of hardly more than an extremely variable wrenlike phrase, sometimes weak, sometimes strong and piercing, it changes so in pattern and quality that I am often uncertain of its identity and no longer imagine *costaricensis* vocally distinguishable from *russatus*. The bird also makes a weak "chirr chrít" of the sort given by a euphonia such as *Tanagra gouldi*, a querulously rising, robin-like "wheirt," and a scratchy, squeaky mew.

***Catharus gracilirostris* Salvin**

SLENDER-BILLED NIGHTINGALE THRUSH

RANGE: Costa Rica and western Panama.

***Catharus gracilirostris gracilirostris* Salvin**

RANGE: Costa Rica.

The Slender-billed Nightingale Thrush is restricted to the very high altitudes on the Cordillera Central and the Talamanca Cordillera. It is sympatric with *frantzii* and not uncommon in some of the rain-forested por-

tions of the lower montane belt. But, as does its neighbor, the Sooty Robin (*Turdus nigrescens*), it becomes abundant only upward from approximately 8000 feet and largely replaces *frantzii* in the montane belt. *Frantzii*, incidentally, weighs half as much again as the Slender-billed. I do not know whether the Slender-billed was originally a forest bird. Now, at any rate, it is plentiful in the park-like highland pastures and occurs in the scrub above timber line; locally it may be very common in patches of woodland. The species is especially numerous on all four large volcanoes of the Cordillera Central, less abundant but by no means uncommon on the northern sector of the high Talamanca Cordillera, along which it continues southward probably in greatly reduced numbers to Panama. Evidently it thrives in conjunction with the partial removal of forest.

The bird is seen singly, but individuals may be scattered all about. Usually it is not at all shy. It hops on the ground in robin-like spurts and daintily comes to statuesque stops. It rises regularly to logs, stumps, shrubs, and the low branches of trees; sometimes it clings sideways to herbaceous stems. Its variable song is not really musical, yet the fuzzy flute-like tones floating ethereally at the very high altitudes are in keeping with the elfish surroundings. It consists of one to three phrases, each usually beginning with a high level note and followed by a lower-pitched quaver. The phrases are either successively higher pitched and modulated, as in the Hermit Thrush (*Hylocichla guttata*) of North America, or alternate contrastingly in key. Often I cannot distinguish this species vocally from *frantzii*. However, I never heard the Slender-billed give the single-note mellow whistle of the latter species. The bird also makes a wren-like buzzy "chrr" or chatter, preceded by a keynote, as well as a robin-like "siss" or "snn."

FAMILY ZELEDONIIDAE

***Zeledonia coronata* Ridgway**

WREN-THRUSH

RANGE: Costa Rica and western Panama.

The Wren-Thrush lives at the upper altitudes in the cool and wet mountainous interior. It has been recorded mostly from the

Cordillera Central, with additional reports from the mountains that border the southern edge of the central plateau. In addition, I found it not uncommon on the crest of the Cordillera de Tilarán; there is no report from the Guanacaste Cordillera. I found it, too, on the northeastern approach to the Talamanca Cordillera south of Cartago. A single record for this cordillera in the southwest (Ujarrás de Térraba) is, in my opinion, sufficient to establish the presence of the bird southward into Panama. Vertically it ranges in the cloud-forested highlands from a low of about 4000 feet in some places, 5000–6000 feet in others, to timber line. It is quite common, particularly in the portions that are almost constantly drenched.

The bird is seen singly, though probably also is present in separated two's, and it seems to be highly sedentary. It keeps close to the ground in dense dark thickety or brushy cover in which it creeps about in concealment. It flies very little and is difficult to observe. In the most impenetrable portions, as along ravines and gullies, its habitat is often shared by the smaller wrenlike *Scytalopus*. In less tangled herbaceous ground cover it occurs with the common highland wood wren, *Henicorhina leucophrys*. Resembling a wren in habits and general appearance, it is also wrenlike in showing curiosity, hence can be taken without much trouble by the patient collector.

The Wren-Thrush would be considered rare if not for its characteristic note. This, the only sound that I have been able to assign the species, is a rather long, level, penetrating, thin whistle, something like "seenk." It brings to mind the similar note of the partially sympatric Yellowish Flycatcher (*Empidonax flavescens*). I did not happen to hear the call that was described by Carriker (1910, p. 332).

FAMILY SYLVIIDAE

Polioptila albiloris Sclater and Salvin

WHITE-LORED GNATCATCHER

RANGE: Western Mexico to Costa Rica; also extreme northern Yucatan.

Polioptila albiloris albiloris Sclater and Salvin

RANGE: Interior of Guatemala, and Pacific

slope from Honduras and El Salvador to Costa Rica.

The White-lored Gnatcatcher, a member of the Central American arid Pacific avifauna, is at its southern limit in northwestern Costa Rica. Virtually confined to the Tropical Dry Forest, barely rising to the upper limits of the life zone along the base of the Guanacaste Cordillera, it is extensively sympatric with *plumbea*, which is primarily an inhabitant of the humid formations. It is much more common north from the head of the Gulf of Nicoya than south of it, and becomes abundant in the driest portion of its range northward from Liberia, where the congeneric *plumbea* is mostly if not entirely lacking. The two species differ in appearance, preferred habitat, and voice.

It is an inhabitant principally of scrubby country, where it often keeps itself concealed in small-leaved low trees and in thickety vegetation in gullies. It is also present in relatively dry woodland with *plumbea*, but does not rise high in the trees as commonly as does the latter bird. It flits and hops vireo-like amid the foliage, seldom flying an appreciable distance. It also engages in fly-catching flutters close to the ground. It is not shy and, like *plumbea*, is seen as a rule in pairs.

Its call note, weak and scratchy like that of a baby bird, or even insect-like, definitely differs from the somewhat patterned, resonant mew of *plumbea*. Sometimes it is followed by a scratchy little "trrit" or "tsitit" (also given alone), which I have not heard from *plumbea*. Its song, a simple series of scratchy wrenlike notes mixed with other unclear ones, sounds like a poor attempt at singing.

Polioptila plumbea (Gmelin)

TROPICAL GNATCATCHER

RANGE: Southern Mexico to Peru and northeastern Brazil.

Polioptila plumbea superciliaris Lawrence

RANGE: Southern Mexico to Panama.

The widespread Tropical Gnatcatcher is distributed along both slopes in the lowlands and inland to the interior highlands. It is most common in the humid tropical belt up to the transition with the subtropical belt, relatively uncommon in the Tropical Dry

Forest, where it is scarce or lacking in most of northern Guanacaste. It becomes uncommon to rare above the lower subtropical belt and does not exceed its upper limits. The species seems to be quite uncommon on the central plateau and is virtually absent from its Pacific portion. Its distribution in the humid life zones from Costa Rica to Mexico apparently complements that of *albiloris* in drier country.

This gnatcatcher is found in most places, except the interior of solid forest and open fields. It does occur in heavily forested regions, but there it keeps to the semi-open; sometimes it is met at openings or along breaks inside forest. It is uniformly abundant in plantation type of country. Indeed, it can be so numerous in some areas as to suggest a recently arrived, blanketing wave of loosely dispersed passage migrants. It forages mostly in small and medium-sized trees, often down to eye level, occasionally high in tall trees, in plantations, partially shaded second growth, isolated stands of trees, and along edges. It is seen singly, more often in pairs, and also in scattered groups.

This little bird may mew and search unafraid right above the observer. Its tail, perkily cocked higher than the head and rooted above the tips of the wings, is flicked continually. It opens and shuts while the bird hovers, and the white feathers flash as do those of certain white-tailed hummingbirds and wood warblers. In its tail-triggered actions the bird combines the dash of a flitting warbler and the briskness of a shrub-tied wren, but it is not impatient to leave one site for another. This gnatcatcher gives the impression of a rather sedentary bird of lively temper content with small horizons.

The frequently uttered note is a mewing nasal "myäää," instantly recognizable. Other birds have a similar note, but this one represents, so to speak, the essence of its type. The fairly musical song usually consists of a simple descending series of whistled chirps. It is slower and more deliberate than the descending trill of its neighbor, the woodhewer *Lepidocolaptes souleyetii*, and more chirpily musical than one of the songs of the yellowthroat *Geothlypis poliocephala*. Sometimes given on a level plane, it loses its character and limited sweetness.

Ramphocaenus melanurus Vieillot

LONG-BILLED GNATWREN

RANGE: Southern Mexico to Peru and southeastern Brazil.

Ramphocaenus melanurus rufiventris (Bonaparte)

RANGE: Southern Mexico (except Yucatan Peninsula) to western Colombia and eastern Ecuador.

The Long-billed Gnatwren is distributed along both slopes from sea level to, locally, the upper subtropical belt, but it is most abundant in the lower parts of its range. Reports from high-altitude Santa María and Lagunaria de Dota are surprising if not inaccurate. The bird is scattered commonly in all kinds of country provided with suitable cover. In lowland Guanacaste, it is found in the fringe of vegetation along the sides of streams that pass through denuded pastures as well as in open gallery forest. Woodland edges apparently furnish the most desirable conditions. The bird also enters good distances along breaks in humid forest, in which it may possibly be resident, but it is far more plentiful along the borders or close behind them. The habitat is always of the same general type: tangles, thickets, second-growth woods, forest undergrowth at openings, or even thickly foliated small trees in plantations.

Wrenlike, the bird moves about rather actively in dense cover. It does not go to the ground nor does it rise much above the level of thickets and undergrowth. It is solitary in its habits even when found in two's, and it may occur in the same thicket with such sedentary birds as wrens and antshrikes. In forest undergrowth it does not mix with the antwrens, greenlets, and other small birds that work their busy way through or over its own scene of operations. Industrious preoccupied with its private affairs, it is slower-paced than the latter birds and lacks their driving restlessness.

Slender-bodied like a gnatcatcher, it is quite unlike the stockier antwrens. Its tail, like that of a gnatcatcher, is very narrow, continually flicked and swiveled, and held a little cocked above the wings. Apart from their elongated bills and slender tails I see no obvious similarity between this gnatwren and the

related *Microbates*. The latter brings to mind, rather, a semiterrestrial antbird in behavior, voice, and habitat. Both gnatwrens, once placed in museum trays with formicariids and now with sylviids, in appearance and actions maintain their anomalous position in the field.

Its usual call is a simple prolonged trill generally rising slightly at the end, sometimes introduced by a keynote or a catch in the throat. It is often musical, sometimes rattling or dry. Occasionally it is transformed into a sighing whistle that tapers slightly downward as it terminates, or it may descend evenly to approach the trill of the woodhewer *Lepidocolaptes souleyetii*. Neither loud nor arresting, it could pass unawares or be dismissed as the call of a tree frog, so in keeping is it with the undercurrent of woodland sounds. It is repeated all day long, thus revealing the presence of the bird and permitting its movements to be followed. The bird also utters a chattering "ch" or "chrr" in series, as does a wren or a greenlet (*Hylophilus decurtatus*).

***Microbates cinereiventris* (Sclater)**

GRAY-BREASTED GNATWREN

RANGE: Nicaragua to Peru.

***Microbates cinereiventris semitorquatus*
(Lawrence)**

RANGE: Nicaragua to central Panama.

The Gray-breasted Gnatwren is a Caribbean species distributed commonly throughout the forested tropical belt. Locally, as along rising ridges, it may be present in good numbers to an altitude of 3000 feet or more in the subtropical belt, but it does not overlap the northwestern divide. It is a true forest bird that occurs also in adjoining shaded secondary woodland. It inhabits the undergrowth, keeping as a rule well below eye level in bushes, shrubs, tangles, herbaceous growth, and brush. This is the same environment favored by the abundant wood wren *Henricorhina leucosticta*. In some of the thickety parts of its habitat it may occur with the other gnatwren, *Ramphocaenus*. It is generally seen in family-sized groups of three or four individuals, also in two's, sometimes alone.

Like the wood wren, it moves about in the dark undergrowth, but it flits and hops rather

than creeps along twigs, vines, and logs, and it clings sideways to stems. Also, it goes to the ground for prey. Wrenlike in its behavior, the bird responds immediately to squeaking and often shows curiosity, as do other undergrowth-inhabiting species. A group may join temporarily a mixed assemblage of wrens, antbirds, greenlets, and other birds working their way through the understory or attending army ants. This delicate, slender-billed little bird holds its short and narrow tail cocked almost at a right angle; the white under tail coverts are erected with the tail. The tail is habitually jerked, flicked, or made to pulsate.

Almost all its notes sound wren-like or antbird-like, as do those of its companion species in the forest understory. I have heard nothing that resembles a song. Characteristic is a "woink woink woink," usually followed by a chatter, or a whining "chwirnk chwirnk" in which both notes rise and weaken in parallel fashion. Just as typical is an antbird-like whining nasal "yeah," a buzzier "meéyahr," a softly mewling "myahr," or a scratchy "myä" suggestive of *Poliophtila plumbea*. Also given are a heavy, hard or harsh, wrenlike chatter, sometimes with a lower-pitched smoother "skwir" mixed in, a querulous scratchy "wree" followed by a chatter, the heavy whine of an antbird, and harsh wrenlike notes. The bird gives voice, too, to an even "peep" with the timbre of an antbird or flycatcher, a strong resonant "peer" or lisping "ptheer," and an extended musical "peeey," falling at the end.

FAMILY BOMBYCILLIDAE

***Bombycilla cedrorum* Vieillot**

CEDAR WAXWING

RANGE: Breeds in North America; winters south through Middle America to Panama, recorded in Colombia and Venezuela.

Judged by its few Costa Rican records, the migrant Cedar Waxwing does not arrive until December, remains in part as a visitant, and may not leave the country until the third week of May. Its numbers appear to fluctuate considerably from year to year. In winter it is regular but far from common in the Pacific northwest at upper tropical and lower subtropical elevations along the Guanacaste

Cordillera, particularly in the Miravalles-Tenorio region. Elsewhere it is a rare wanderer or transient not seen perhaps for years. It has been found several times in the subtropical and lower montane belts in the region of the central highlands and the subtropical General basin in the southwest. It is unknown from all the lower Caribbean slope. The bird apparently follows the slopes of the mountains, avoiding the flat lowlands. Preferring the semi-open, it frequents woodland edges, forest-enclosed openings, tree-scattered pastures, and tree-lined cartroads.

I found it in variously sized, flock-behaving bands almost always in the tops of trees. Foraging for small fruits or sallying for insects, the birds bring to mind a loitering group of migrating Eastern Kingbirds (*Tyrannus tyrannus*), and they may perch quietly in partial concealment for long periods, stiffly but more slenderly erect than the kingbirds. Though unprovoked, a band may take off as if on impulse in swift direct flight to another tree some distance away, where the birds again retire into the crown. The only note, usually given in flight, is a weak, coarsely sibilant, saliva-coated "ss," similar to that of some robins (*Turdus*) and the Buff-throated Saltator (*Saltator maximus*).

FAMILY PTILOGONATIDAE

Ptilogonys caudatus Cabanis

LONG-TAILED SILKY-FLYCATCHER

RANGE: Costa Rica and western Panama.

The species is common in the high mountains, where it inhabits the lower montane and, especially, the montane belts in the central highlands, the Dota region, and the northern sector of the Talamanca Cordillera, along which it undoubtedly continues into Panama. It is not known from the northwestern cordilleras. Though reported from the upper subtropical belt in the central plateau region, it is only a rare wanderer from the adjacent higher parts of its range. Its preferred habitat is semi-open country with scattered tall trees, such as selectively cut-over woodland, parklike pastures, and the borders of forest-enclosed clearings. It does not seem to enter well into forest, but is at home in the crowns of patches of forest.

A social species, it is generally seen grouped to a dozen or so seemingly paired members that roam widely, sometimes passing high over the scrubby tops of the big volcanoes. Notwithstanding, a band may settle for a few days or a couple of weeks at a particular place selected, it would appear, at random. Confining their activities to this site, the birds perch high in leafy trees, on lofty bare twigs, or the tips of stubs; they may also conceal themselves in the crowns of smaller trees. Where abundant, or perhaps only during the breeding season, they descend regularly to shrubs. Paired birds and groups dash back and forth among the trees in sliding, dipping, and shooting glides punctuated by fluttering beats too quick for the eye to follow. In the air the body of this silky-flycatcher appears long and slender, and the relatively short and narrow wings extend stiffly at right angles, like the bar of a cross. The spread tail shows a good deal of white, and its white sides flash during a hover. Flying with the wind, the birds attain an arrow-like velocity; against it they may be retarded almost to a stationary balance.

The bird sails out from its high perch in tail-spreading short sorties as does a sallying flycatcher, then returns to the same twig or stub to sit slenderly erect. It also searches among leafy branches. The search consists mainly of a turning of the head to look about. As this sort of energy-saving diligence generally seems to go unrewarded, the bird flits to another stopping place in the foliage to apply anew what appears to be an ineffectual method.

Sounding like crickets on high, the birds keep uttering their very dry or, at best, weakly musical notes even during a lull in activity. These include a clipping, clicking "chítit-chítit" or "tchrititit" and a more birdlike "chhteét." The species also gives a rapid, very dry, climbing series of notes with a guttural quality. The true song is heard seldom. It rather resembles the burred one of its highland neighbor, the tanager *Piranga bidentata*, but it is even more fuzzy.

Phainoptila melanoxantha Salvin

BLACK-AND-YELLOW SILKY-FLYCATCHER

RANGE: Costa Rica and western Panama. This silky-flycatcher, which occurs at high

altitudes in the central highlands, where its status varies between uncommon and fairly common, and on the Talamanca Cordillera, where its relative abundance is not known, has the same distribution and vertical range as the preceding species. The two species are very different, even apart from their obvious morphological dissimilarities. *Phainoptila* is a forest bird; at any rate, it frequents the thick foliage of dense stands of arborescent vegetation and the heavily overgrown woodland borders so common in mountainous, broken terrain.

I do not know whether it is really shy and wary, but so habitually does it keep concealed, usually at shrub height, in the mixture of trees and tall shrubbery that I was astonished to see it once perched boldly in open view. It apparently forages mostly, perhaps entirely, for berries; nearly all my specimens had the vent stained purplish. I did not see it sally for insects. When occasionally it flies a bit, it seems to be in the act of fleeing one mass of vegetation for another. It is usually seen singly, but probably occurs in loosely associated pairs. Robin-like in general appearance, it gives a robin-like sibilant "sit," also a chinking "tsip."

FAMILY CYCLARHIDAE

Cyclarhis gujanensis (Gmelin)

RUFIOUS-BROWED PEPPERSHRIKE

RANGE: Northeastern Mexico to Bolivia and northern Argentina.

Cyclarhis gujanensis subflavescens Cabanis

RANGE: Costa Rica and western Panama.

The peppershrike in Costa Rica is typically an inhabitant of the central highlands, primarily in the subtropical belt and here and there in the lower montane belt. It is most abundant on the central plateau, where it seems to wander about locally, frequenting the foliage of shade trees in coffee fincas and the trees, shrubbery, and live fence posts along boundaries. Eastward, it extends into the Reventazón drainage to the lower limits of the subtropical belt. There it is to be met occasionally on wet-forested slopes and ridges or at breaks in forested terrain, for the most part at a mean elevation of 3000 feet. Other-

wise, except for the Río Frío region, it is unknown from the Caribbean slope. Southward, it is not reported beyond the Dota region, though the race reappears in western Panama. Westward, the highland range continues to Poás Volcano and onward along the Cordillera de Tilarán, where I found it abundant at Monteverde on the Pacific face; there is no report from the Guanacaste Cordillera proper.

The species also occurs, in smaller numbers and under different environmental conditions, in the Tropical Dry Forest, especially along the sides and at the head of the Gulf of Nicoya, where I even saw a bird in tidal mangroves. Some of these individuals are more extensively yellow below and paler-crowned than the highland birds, thus tending toward *nicaraguae* of the arid Pacific lowlands farther north, perhaps including the Costa Rican shore of Lake Nicaragua. Costa Rican birds thus seem to comprise two populations, one native to the Costa Rica-Chiriquí highlands, the other belonging to the Central American arid Pacific avifauna, which have met and intergraded in Guanacaste.

In my experience the bird generally occurs singly, usually amid foliage at medium heights in tall trees or in the crowns of smaller ones. At Monteverde, however, I often saw it in two's, three's, and four's in open view at eye level along the borders of woodland. A relatively slow-moving bird, it clings to the foliage or stands and looks about. Frequently it calls for long periods on end, and its musical voice is as rich and mellow as that of some wrens and grosbeaks. It has two sorts of not dissimilar calls or phrases, each subject to considerable variation. One is a rapid, descending "wúchety wúchety woo" or an up-scale "woo chewoó chewoó cheweé." The other, a rapid two-part "itreé-ítrüoó," is a paired set of two two-note musical chirps for which I have also substituted the words "d'ye see, or don't you."

FAMILY VIREOLANIIDAE

Smaragdolanus pulchellus (Sclater and Salvin)

GREEN SHRIKE-VIREO

RANGE: Southern Mexico to Colombia and western Venezuela.

***Smaragdolanus pulchellus verticalis* (Ridgway)**

RANGE: Nicaragua and Caribbean Costa Rica.

***Smaragdolanus pulchellus viridiceps* (Ridgway)**

RANGE: Southwestern Costa Rica to central Panama.

The relatively uncommon shrike-vireo is distributed in the humid life zones on both slopes. Though centered in the tropical belt, where it is found down to sea level, it is, I suspect, primarily an inhabitant of low foothills and their fringing lowlands. The Caribbean *verticalis* is common to abundant locally in wet-forested areas, as in the northeast; it has not yet been recorded from the southeast. It has seldom been found even in the lower limits of the subtropical belt, only along the approaches to the central highlands. Apparently it follows larger river valleys inland, especially the Reventazón, as there is a record from Orosi at approximately 3500 feet. I was very surprised to find it at 4500 feet, well up in the subtropical belt, on the Pacific face of the Cordillera de Tilarán. The only other report for the northwestern divide is from Bijagua, considerably lower and on the Caribbean slope of the Guanacaste Cordillera. The southwestern *viridiceps*, which also prefers wooded areas, is scarce to uncommon in the lowlands. It becomes more abundant in the upper tropical belt on the approaches to the Talamanca Cordillera, but barely rises above the upper limits of the belt.

Few individuals are actually seen, but the true abundance of the species is proved by the "song," which can be heard from all sides in some places. The bird prefers country of the plantation type and cutover areas in the vicinity of forest, where young second growth is mixed with emergent trees. It occurs mostly in more or less sedentary pairs, also singly, from the stratum of shrubs to medium heights in tall trees or the crowns of smaller ones. It is uncommon inside forest, keeping to the upper layers in which it passes unnoticed but for its call. It suggests a green antwren in its heavy-billed, short-tailed proportions, but it is quite deliberate in its actions. It peers and peers closely at the foliage, perhaps while clinging to a stem or hanging upside down

from a leaf. Slow-paced, sometimes creeping, it searches the branches and foliage for prey and, wrenlike, reaches its bill into clusters of leaves. It may even fly-catch from shrubbery occasionally.

Its song, or call, is given tirelessly most of the day. In *verticalis* it is a musical, usually three-note "cheéur·cheéur·cheéur" on the same level. As the notes also sound like "cheery," the call is sometimes confounded with the "cherry-cherry" of *Saltator maximus*. In *viridiceps* it is closer to a three- or four-syllable chatter, "chuyh·chuyh·chuyh·chuyh," or an almost "spinking" "pü·pü·pü," or a short-noted "three·three·three." The species also makes a weak woodpecker-like titter or rattle, "tit·tit·tit·tit·tit·tit," either rapidly or not. A somewhat different cry is a rapid "tit·tit·ererr," with the final portion descending. Another note, given once or twice, may be smoothly harsh, like that of a wren, or throaty and slightly resonant, like the "rä" or "räou" of an antbird. Low-pitched, slow, scratchy sounds, with some of the guttural quality of *Tityra semifasciata*, are also made.

FAMILY VIREONIDAE***Vireo pallens* Salvin****MANGROVE VIREO**

RANGE: Mexico to Costa Rica.

***Vireo pallens pallens* Salvin**

RANGE: Nicaragua and Costa Rica.

The distribution of this vireo at its southern limit in northwestern Pacific Costa Rica conforms to that of the Central American arid Pacific avifauna. Here it is an isolated population living exclusively in the mangroves at the head and along the shores of the Gulf of Nicoya. It is apparently restricted to the Tropical Dry Forest. At any rate, it has not been found in the mangroves farther south in the humid-forested life zones.

In my limited experience with it, the bird is uncommon, sedentary, and solitary. It hops and flits close to the ground amid the twigs and foliage of the mangrove plants as well as on solid ground where the mangroves are mixed with other trees and ground cover. The bird is quite brightly marked, not at all shy,

utters a rather slow, conversational chatter and a harsh "spinking." I did not hear its song.

[The Caribbean race, *semiflavus*, distributed in the lowlands from southern Mexico to southern Nicaragua, has been recorded at Greytown and perhaps will be found just across the border in Costa Rica.]

Vireo carmioli Baird

CARMIOL'S VIREO

RANGE: Costa Rica and western Panama.

Carmioli's Vireo is known in Costa Rica from the central highlands, including the Dota Mountains, and the northern sector of the Talamanca Cordillera; it surely ranges southward along this cordillera to Panama. Distributed upward from somewhat above the central plateau to timber line, it is common, even abundant, only in the upper part of its range, especially the montane belt. At the very high altitudes it is the only vireo present; in the lower montane and upper portion of the subtropical belts, it is one of two resident vireos, the other being the more abundant *leucophrys*. It frequents the borders of woodland, patches of forest, and clumps of trees in the parklike pastures. Generally it forages from above medium heights to very high in the trees, occasionally much lower. It is almost always encountered singly, usually inside the foliage where its voice identifies it. In appearance, voice, and behavior it is a typical *Vireo*.

The song is patterned like that of the congeneric *olivaceus*, *flavoviridis*, and *flavifrons*. In its moderate buzziness it most closely resembles the burred one of *flavifrons*. Although of the same question-and-answer type as the others, it is even more fragmented and perhaps more emphatic; alternate phrases may or may not be squealy or burred. The bird also makes a "churreéz" similar to that of the wren *Thryothorus rutilus*.

Vireo flavifrons Vieillot

YELLOW-THROATED VIREO

RANGE: Breeds in eastern North America; winters from southern Mexico and West Indies to Colombia and Venezuela.

This migrant vireo begins to arrive in the latter part of September but is not seen regu-

larly until well into October, remains as a common to abundant visitant, and is mostly gone from the country by the third week of April. Occurring from both coasts to altitudes somewhat above those of the plateau region, it is tolerant of the wettest and driest conditions in Costa Rica. The bird is found in semi-open country as well as in heavy forest, but is most common in cutover areas. In the semiopen it usually forages low, between 10 and 40 feet up, sometimes much higher in the trees. Inside the forest it inhabits the upper strata for the most part.

Individuals are generally spaced well apart so that they appear to be solitary. Should two birds be found together, they show little interest in each other. The Yellow-throated also travels about with other species, including a mixture of warblers, tanagers, greenlets, and others, not with its own kind. Apart from color, its erect posture and, in contrast with other vireos, its usually cocked tail identify it. Compared with a warbler, the stouter-bodied Yellow-throated moves about slowly and heavily, almost deliberately. It rests for longer periods and apparently seeks larger prey. Should an insect the size of a cicada, for example, be captured, the bird picks pieces from it in the manner of a shrike. Its bill, thicker than that of a warbler and tipped with a little hook, is then seen to perform the function its form suggests.

The common call on the wintering grounds is a harsh, rapidly descending "zhuh·zhuh·zhuh·zhuh·zhuh" (or "zhir" or "chuz"); the final note may be repeated haltingly a number of times. Resembling a heavily burred chuckle, it is as distinctive of the bird as its appearance. A seldom-heard single note is a soft, antbird-like "k·yoor," sort of whining or twanging. The true song, patterned like that, for example, of *flavoviridis* but slower and burred, I have heard sung in snatches as early as latter January and fully by the end of March.

Vireo olivaceus (Linnaeus)

RED-EYED VIREO

RANGE: Breeds in North America; winters chiefly in South America.

The Red-eyed Vireo is an abundant spring and fall transient and a rarely seen visitant. It arrives in fair numbers by the second half

of August and becomes plentiful in September and October. It returns northward in April and the first part of May. A specimen dated June 9 at San José was either extraordinarily late or, I suspect, physiologically abnormal. (Incidentally, I met the species once in early June in Honduras.)

During migration the Red-eyed occurs almost everywhere, from both coasts to the lower montane belt, in tree-dotted open country and in wooded regions. Though most common outside the forest, it passes along the borders and also occurs at openings and along breaks inside the forest, as a rule in the company of mixed bands, often including migrant wood warblers, that travel through the trees. Outside the forest it is seen from shrub height to high in the trees but most often at medium heights, usually in small "waves," seldom alone. In the winter it seems to occur regularly though very uncommonly on the central plateau, and it may show up as a rare wanderer at low elevations. An active bird, it flits amid the foliage, to which it also clings and from which it hangs habitually. It is uniformly silent.

Vireo flavoviridis (Cassin)

YELLOW-GREEN VIREO

RANGE: Mexico to Bolivia and western Brazil; migratory in Mexico and Central America.

Vireo flavoviridis flavoviridis (Cassin)

RANGE: Breeds from Mexico to Costa Rica; winters in basin of Upper Amazon.

[**Vireo flavoviridis hypoleucus**
van Rossem and Hachisuka]

RANGE: Breeds in Mexico; reported from southeastern Peru in winter; in migration in El Salvador and Panama.]

[**Vireo flavoviridis forreri** Madarász]

RANGE: Breeds in Tres Mariás Islands; winter range unknown, probably eastern Ecuador; on migration in western Mexico, Guatemala, and El Salvador.]

The Yellow-green Vireo, a migrant from South America, is a breeding summer visitant over much of the country. It is abundant in

the spring and common in the fall, when it migrates at approximately the same time as and often with the North American *olivaceus*. It arrives in singing "waves" that, covering the country from both coasts to the central highlands, are most noticeable in February and March over the plateau region. These fresh arrivals may be present locally in almost every bush and tree. Highly excited and not at all shy, they noisily chase about with twittering metallic chatters and snatches of song, and even appear animated when perched with fan-spread tail. The majority of the migrants no doubt pass on northward through the country. Those that remain are most abundant on the central plateau and other suitable portions of the subtropical belt down to its lower limits. In smaller numbers the species also nests in the lowlands of both slopes, avoiding extensively wooded regions. It prefers plantation and semi-open country with trees, bushes, and shrubs. It feeds on insects and vegetable matter, generally from a few yards up to medium heights in medium-sized trees. Coffee fincas with shade trees evidently provide ideal conditions.

Though the status of the Yellow-green in the winter is uncertain, a scattering of individuals undoubtedly remains. There are a record for November 20 from Miravalles, none apparently in December, and two for January (one of them on the sixth) from the central plateau. I met it in the latter part of January near Tilarán in the northwest and near Buenos Aires in the southwest.

The breeding bird is hard to find as it sings amid the foliage. Its spirited fragmented song is very much like that of *olivaceus*, though perhaps not so clear and musical. Often chirking, sometimes burred, ending at times with a rippling chatter, the phrases may succeed one another fairly rapidly or after appreciable pauses. In northern Guanacaste, where the bird was extraordinarily abundant at the end of May, 1961, I regularly met small groups chattering excitedly, perhaps because at this late date the dry season was still in force and most of the birds were making a delayed start at building their nests. Among the other cries are a metallic chatter, a harsh mew heavier than that of a gnatcatcher, and, in flight, a speeded, somewhat burred "squeesqueesquee."

Vireo philadelphicus (Cassin)

PHILADELPHIA VIREO

RANGE: Breeds in eastern North America; winters from southern Mexico to Colombia.

The Philadelphia Vireo, a regular visitant, is seen much more commonly some years than others. It arrives apparently very late in the fall and departs by the middle of April. The wintering bird is usually spread thinly from both coasts across the central plateau, sometimes to the upper limit of the subtropical belt. In general, it is considerably more common along the Pacific slope than the Caribbean (where it is not recorded from the southeast). I found it most frequently in lowland Guanacaste, especially at the base of the northwestern divide, and abundantly in February in the Coto Brus district of the southwest. Though not present in heavy forest, the bird is apt to appear in most kinds of wet or dry wooded country, including selectively logged woods, forest edges, second growth, cultivated lands with trees, and pastures with clumps of thickets and trees.

This vireo is usually met singly, as a rule from eye level to not more than a few yards up, but sometimes two or three or more individuals join other small birds that are foraging higher in the trees. In relatively low vegetation the restrained activity of the bird approaches that of a small arboreal flycatcher rather than a restlessly searching warbler; the converse is true higher in the trees. Stouter-bodied and broader-headed than a warbler, it may feature a slow head turning reminiscent of a becard. It takes berries in addition to insect prey.

In Costa Rica the bird is generally silent. Occasionally it utters a somewhat musical "chee·ir, cheerf," or "chirf" that contains a little ripple, also a weak "chereé."

Vireo gilvus (Vieillot)

WARBLING VIREO

Range: Breeds from Canada to Mexico; winters from Mexico to Guatemala and El Salvador.

The Warbling Vireo, a migrant from the north, seems not to have been recorded south of El Salvador. I finally found it after a six-year search in Costa Rica. On April 19, 1958, in the Sarapiquí region of the northeastern

lowlands, I observed at length an individual which, in my opinion, belonged unquestionably to this species. The bird (possibly one of two individuals) was about 10 feet up in the lower branches of a medium-sized, thinly foliated tree in a young cacao plantation. As a few Red-eyed Vireos (*V. olivaceus*) and one or two Philadelphia Vireos (*V. philadelphicus*) were foraging virtually side by side with it, I could not have hoped for better viewing conditions.]

Vireo leucophrys (Lafresnaye)

BROWN-CAPPED VIREO

RANGE: Southern Mexico to Bolivia and Venezuela.

Vireo leucophrys chiriquensis (Bangs)

RANGE: Costa Rica and western Panama.

The native Brown-capped Vireo occurs from about the middle of the subtropical belt through most of the lower montane belt. It is not known to rise higher into the range of the strictly high-altitude avifauna. It has been found most often in the central highlands, but occurs also in the Dota region and along the Pacific slope of the Talamanca Cordillera, probably also along its Caribbean side. Elsewhere it is known only from the Pacific slope of the Cordillera de Tilarán, where I found it at Monteverde. In the central highlands only *carmioli* is likely to share part of its range.

Generally occurring in small groups, it is also met singly and in two's. It frequents edges and flies across openings from one forested patch to another wherever there is woodland. It may occur high in the trees, where its insistent call announces its presence, or lower in second growth and bushy thickets. A free-living bird, it usually moves about in dashing rounds, yet may remain at a stopping place for a lengthy period. This behavior is more like that of certain warbler-like flycatchers than of a *Vireo*. In lower growth, however, it rests and forages in the usual *Vireo* manner.

Its unimpressive song consists simply of five or six chirking notes given alternately up and down; none of the notes is slurred or given special emphasis. By contrast, its arresting call note is a penetrating "pss" or "piss," given singly and rather gently or,

more characteristically, a few to perhaps 10 consecutive times in a very urgent manner. It brings to mind the similar call of the flatbill *Tolmomyias assimilis* of the Caribbean lowlands. Vocally, the birds I heard in Costa Rica evidently differed considerably from those heard by Eisenmann (1962b, p. 505) in western Panama.

***Hylophilus flavipes* Lafresnaye**

SCRUB GREENLET

RANGE: Costa Rica to Colombia and Venezuela.

***Hylophilus flavipes viridiflavus* Lawrence**

RANGE: Costa Rica and Panama.

The Scrub Greenlet in Costa Rica is a Pacific species that belongs to the southwestern avifauna. It inhabits bushy, scrubby country dotted with impenetrable thickety stands, patches of new growth, roadside hedges, overgrown fences and boundaries, edges of savannas, and beach-bordering canebrakes; it does not enter forest. Hence, in view of its habitat preferences, the occasional occurrence of the bird northward into the southern portion of the Tropical Dry Forest on both sides of the Gulf of Nicoya or its absence south of the Térraba Valley should cause no surprise. Excepting a specimen in the Museo Nacional, supposedly collected at San José, the species is restricted to the tropical belt. It occurs in the coastal lowlands, especially at beaches, but its center of abundance seems to lie at upper tropical-belt elevations in the General-Térraba region.

This greenlet brings to mind neither the congeneric *ochraceiceps* nor *decurtatus*, from both of which it differs as strikingly in habitat and behavior as in its relatively long-tailed proportions and hue and style of dress. Moreover it occurs singly and in two's, sometimes in three's, never in bands. Indeed, it differs from any other Costa Rican vireo in its actions just as it does in its ensemble of pink-colored soft parts and self-identifying voice. Actively foraging in hedges and thickets, it may bring to mind a fly-catching warbler or a scrub-dwelling flycatcher. Dropping to the ground in the open, it resembles a small finch.

Its simple song takes either of two forms. One consists of two similar notes given alternately on different levels and repeated two or

three times as a childish singsong ("chee cheer chee cheer chee cheer"), the gently insistent pattern of which is quickly recognizable. It may be altered to a few consecutive "chirée" 's. The other song consists of a single note repeated as a linear series not quite so easy to remember: "weer·weer·weer·weer·weer·weer." Also given are burred, buzzy, and scratching or mewing sounds.

***Hylophilus ochraceiceps* Sclater**

TAWNY-CROWNED GREENLET

RANGE: Southern Mexico to Bolivia and Amazonia.

***Hylophilus ochraceiceps pallidipectus* (Ridgway)**

RANGE: Honduras to western Panama.

One of the common forest birds of Costa Rica, the Tawny-crowned Greenlet occurs in the humid life zones on both slopes. It is widespread in the tropical belt, from which it rises in hardly diminished numbers well into the subtropical belt along the northwestern divide and the Talamanca Cordillera in the southwest, but only to the lower limits of the belt on the Caribbean versant of the central highlands. Seldom if ever straying from "rain" forest, it may be present almost anywhere in the heavily wooded portions of its range, thus excluding the Tropical Dry Forest and all the central plateau region.

This greenlet (which is not green) brings to mind an antwren in coloration and habits rather than a vireo. It almost always occurs in small bands that troop through the forest understory immediately above the ground cover, hence does not compete with the congeneric *decurtatus* which keeps considerably higher in the trees. The members are as noisy and active as the arboreal antwrens (*Myrmotherula* spp.) with which they often associate, hence are not easy to observe as they flit about and cling to the foliage. The bands are constantly on the move and soon become lost in the vegetation. Their receding notes, an echo of the recent flurry, continue to reach the listener a little while longer.

The usual querulous, squeaky, scratchy, mewing, or whining notes, sounding like "erk," "urnk," "oik," or "oink," given several times in succession, resemble those of the antwren *Myrmotherula schisticolor* and, in reduced scale, those of the woodhewer *Dendro-*

colaptes certhia, certainly not those of a vireo. What may be the "song" is heard seldom. It is a whistled "wee teé," hardly distinguishable from that of the flycatcher *Terenotriccus* or several other birds. Also given is a "pska·wrrrr," guttural and unclear as the similar cry of the euphonia *Tanagra gouldi*, with the "pska" hardly more than an introductory catch. Distinctly different from the last, though it may not seem so in print, is a "pska·weeer," given also as a quick little ripple, which introduces a clear whistled note. This wiry whistle, rising slightly with weakly increasing intensity, may be given alternately by two birds. It is similar to the call note of the wren *Microcerculus* and exactly the reverse of that of the gnatwren *Microbates*, which descends slightly with weakly decreasing intensity. Sometimes a group utters individually a number of alarmed-sounding "chow" notes, such as those of a disturbed covey of ground birds. Also given are an unclear cicada-like note and a piercing "eerk" not unlike the above-mentioned "weeer."

***Hylophilus decurtatus* (Bonaparte)**

GRAY-HEADED GREENLET

RANGE: Southern Mexico to western Ecuador.

***Hylophilus decurtatus decurtatus* (Bonaparte)**

RANGE: Southern Mexico to western Panama.

Hylophilus decurtatus pallidus

(Dickey and van Rossem)

RANGE: El Salvador to northwestern Costa Rica.

One of the common birds of Costa Rica, the Gray-headed Greenlet inhabits the tropical and lower subtropical belts the length of both slopes, including the relatively dry Guanacaste lowlands. It is found in solid forest as well as in agricultural and pasture lands, but is most abundant in open woodland and plantations. Usually traveling about in pure groups, it is as active as a warbler flitting in foliage and constantly changing sites. In forest it occurs mostly well up in the trees, where, if not for its voice, the bird could be difficult to identify. In open woodland and plantations it keeps much lower, apparently

favoring the same stratum as, for example, the warbler *Dendroica pensylvanica* or the gnatcatcher *Poliophtila plumbea*. Apart from its vireo or warbler style of coloration, this greenlet resembles the *Myrmotherula* antwrens in appearing short-bodied with a short (but narrow) tail and a rather overly long bill, slightly hooked at the tip. It bears no resemblance to the congeneric *ochraceiceps* or *flavipes* in coloration, general appearance, behavior, and voice.

Its typically vireo-like call consists of a slightly variable single or repeated chirping phrase. This is the only one of the three greenlets that sounds like *Vireo*, though the latter birds generally do not repeat the same phrase but follow with an antithetical one. What may be its "song" consists of one of the above phrases usually repeated and broken into by a rapid, warbler-like "weeta·weeta·weeta·weeta." A common utterance often specifically diagnostic is a harsh "chchfch chrrch·chrrch," also a soft "chirít." Its call note is a harsh and scratchy mew rougher than that of a gnatcatcher, sometimes given continuously. Scratchy and twittering sounds are also made.

FAMILY COEREVIDAE

***Diglossa plumbea* Cabanis**

SLATY DIGLOSSA

RANGE: Costa Rica and western Panama.

***Diglossa plumbea plumbea* Cabanis**

RANGE: Costa Rica and adjacent western Panama.

The Slaty Diglossa, the only coerebid that inhabits the very high altitudes, is most abundant in the montane belt to above timber line. It ranges downward into the upper subtropical belt in the plateau region, but is rare or perhaps seasonal below the upper lower-montane belt. It is most common in the central highlands from which it is distributed southward in the Dota Mountains and along the Talamanca Cordillera; it is not known from the Cordilleras de Guanacaste and Tilarán. It seems to be essentially a non-forest bird that frequents forest borders, thickety edges, bushes and brush in clearings or openings in forest, epiphyte-covered stumps, overgrown ravines, and high-altitude scrub.

The diglossa is seen singly, sometimes in two's or three's, seldom in larger groups, but a number of individuals may occur at a particular site. Keeping low in the flowering vegetation, it behaves as a nervously active, wing-flicking warbler. It is strongly attracted to small-flowered shrubs in which, as described many years ago, it exhibits a passion for the necks of the blossoms it pierces with its oddly shaped bill. As do its neighbors, the *Myioborus* redstarts, it habitually makes short fly-catching sallies from brush.

In common with other high-altitude birds, it has an undistinguished unmusical song of several weak, warbler-like notes that sounds like an abbreviated version of that of the warbler *Parula pitiayumi* or the wren *Troglodytes ochraceus*. Also given are a continuous thin "tsitting," accompanied by a flicking of the wings, and a weak "tsit."

***Chlorophanes spiza* (Linnaeus)**

GREEN HONEYCREEPER

RANGE: Southern Mexico to Bolivia and southeastern Brazil.

***Chlorophanes spiza arguta* Bangs and Barbour**

RANGE: Nicaragua to Panama.

The Green Honeycreeper is distributed over most of the humid life zones, thus excluding the dry-forested northwest and also the central plateau, including its facing slopes. It occurs in seasonally fluctuating numbers the year round in the tropical belt. It rises to about the middle of the subtropical belt, where it also seems to be seasonally abundant on both slopes. From the Caribbean side it spreads to the humid-forested Pacific face of the northwestern divide, so far as known, north from Lake Arenal. There is no report from the Dota region, where it is surely present.

The species prefers forest borders, shaded plantations in wooded regions, and, at higher elevations, forested ridges and natural breaks in forest. To my knowledge it is the only Costa Rican honeycreeper that occurs below the canopy inside virgin forest, where I met it occasionally between 10 and 20 feet up at tangled openings, such as ravines and the borders of periodically overflowing streams. Outside the forest it frequents thickets,

shrubs, and trees to all heights. It is found alone, in two's, and in small groups of mostly female-plumaged individuals. Though groups apparently troop about widely at times, as do the species of *Cyanerpes* and *Dacnis*, yet the bird appears to be, for the most part, rather sedentary and less active than the other honeycreepers. Often jerking its wings nervously, it features the flicking of a single wing as does the flycatcher *Pipromorpha*.

I have heard from it only a warbler- or hummingbird-like chipping, including strong and weak single chips, a repetitive "stchip," a thin "tsnt" or "tsst," and, perhaps as its "song," a tirelessly repeated "tsip" given rapidly and alternating with tiny intervals of the same length.

***Cyanerpes cyaneus* (Linnaeus)**

BLUE HONEYCREEPER

RANGE: Southern Mexico to Bolivia and southeastern Brazil; Cuba.

***Cyanerpes cyaneus carneipes* (Sclater)**

RANGE: Southern Mexico to central Panama.

The Blue Honeycreeper is primarily a Pacific species distributed the length of the country from the lowlands to the lower subtropical belt. Apparently avoiding very wet areas, it is the only honeycreeper in the Tropical Dry Forest and is scarce in the wet-forested Golfo Dulce region. It rises in diminished numbers to the central plateau and continues eastward to the Caribbean slope, over most of which it is scarce and recorded from few localities in the eastern and southern portions of the tropical belt and on the approaches to Turrialba Volcano. In the open Río Frío region, however, it is abundant.

The bird is generally seen in groups to the size of small flocks that work their way through the trees beside forest and along borders, or in open, thinned, or scrubby woodland, usually at medium heights but also much higher. It does not seem to occur inside "rain" forest. Fly-catching or fluttering for insects, clinging to and hanging from foliage in order to secure small fruits or inserting its bill into flowers, it is as active as a warbler. It also behaves as do a number of tanagers when it creeps along limbs, bends to

search twigs, and stretches its neck to reach leaves.

This beautiful little bird is undistinguished vocally. It makes a characterless, scratchy or sibilant, gnatcatcher-like mew, a swallow-like "tshrrp" and a hummingbird-like "tsrr," a weak buzz or reedy "izz," a spitty "sits," "sit," "swit," or "twis," and a stronger "swit" or "tswiss." What may be the "song" is a continuous hummingbird-like "sink" or "tsink" given every second or half second.

Cyanerpes lucidus (Sclater and Salvin)

SHINING HONEYCREEPER

RANGE: Southern Mexico to northwestern Colombia

Cyanerpes lucidus isthmicus Bangs

RANGE: Nicaragua to extreme northwestern Colombia.

The Shining Honeycreeper, in contrast to the congeneric *cyaneus* of similar behavior, seems dependent on a heavily forested humid environment. It is distributed primarily over the Caribbean and southwestern Pacific slopes from the coasts well into the subtropical belt, especially on the Caribbean side. Compared with *cyaneus*, it is met regularly on the Caribbean slope, where *cyaneus* is scarce, though its numbers fluctuate seasonally in any one place. On the central plateau it is a rare wanderer, whereas *cyaneus* occurs with greater regularity and in larger numbers. It is absent from the Tropical Dry Forest, where *cyaneus* is common, nor did I find it in the Río Frío region, where *cyaneus* was abundant. It barely rises to the northwestern divide, at which it is known only from Tenorio and Cerro Santa María in the northern sector, whereas *cyaneus* is fairly common. In the southwest it is completely sympatric with *cyaneus* by which it is generally outnumbered, except in the wet-forested Golfo Dulce lowlands where the situation is reversed.

Usually it is met in groups, also alone. The size of the groups and the total number of individuals vary seasonally everywhere. The bird is found principally along the borders of forest and in neighboring tree-scattered clearings and openings; it also enters a bit onto the forest canopy. Occurring from medium heights in small trees to high in tall ones, it

forages actively in the foliage as does a warbler and it also fly-catches. It creeps along bare or foliated branches in the manner of certain tanagers, turning from side to side to scan them industriously for prey, or first hovers and then lights and clings before exploring scars and knotholes. Quite unlike a warbler at other times, it perches quietly in open view on a lofty bare twig or on the very top of a high crown.

It makes weak but sharp little "tsit" 's or "tsip" 's, individually or run into a trill, chipping "tsit" 's repeated, perhaps as its "song," in irregular succession in the manner of a hummingbird, and a high, thin, sibilant, penetrating "tss," sometimes repeated. I have not heard from this species the buzzy or mewing little notes of *cyaneus*.

Dacnis cayana (Linnaeus)

BLUE DACNIS

RANGE: Nicaragua to Bolivia and extreme northeastern Argentina.

Dacnis cayana ultramarina Lawrence

RANGE: Nicaragua to extreme northwestern Colombia.

Dacnis cayana callaina Bangs

RANGE: Pacific slope of southern Costa Rica and western Panama.

Distributed over the humid-forested portions of both slopes, the species is represented by *ultramarina* on the Caribbean side and *callaina* on the Pacific side southward from the entrance to the Gulf of Nicoya. Both races are primarily inhabitants of the tropical belt and also rise somewhat into the lower subtropical belt. *Callaina* is undoubtedly the more abundant of the two as it is met commonly, especially in the General-Térraba region, whereas *ultramarina* is encountered only occasionally. Neither form is known from the central plateau and the entire northwest (north of the Río Grande de Tárcoles), including the continental divide and the northwestern Caribbean slope. As do most Costa Rican honeycreepers, they perform apparently seasonal vertical migrations.

Though largely if not entirely restricted to wooded country, this honeycreeper is essentially a nonforest species. It occurs at all

heights at the borders of forest, in thinned woodland or subforest, and in adjacent semi-open areas with trees and shrubs. It is seen singly, in small groups, and in larger bands. Hardly differing from *Cyanerpes* in general behavior, it explores foliage and searches limbs and twigs for prey, and I have seen it swallow small berries and cling to *Cecropia* pods. The only notes I have heard are a high-pitched "tsit," a thin "snt," and an unhoney-creeper-like "skwirk·irk."

Dacnis venusta Lawrence

SCARLET-THIGHED DACNIS

RANGE: Costa Rica to western Ecuador.

Dacnis venusta venusta Lawrence

RANGE: Costa Rica to central Panama.

The Scarlet-thighed Dacnis has virtually the same range as the congeneric *cayana*, covering the Caribbean slope (though not recorded from the southeast) and the humid-forested southern half of the Pacific slope. It is absent from the Tropical Dry Forest, present but apparently scarce along the northwestern divide both on the Caribbean side, where it is reported northeast of Tenorio Volcano, and on the Pacific slope of the Cordillera de Tilarán, where I found it at Monteverde. It is accidental or probably a rare wanderer on the deforested central plateau. In the central highlands it occurs mostly on the Caribbean versant, and it is known also from the Dota region. Its center of abundance, higher than that of *cayana*, seems to lie in the subtropical belt, from which the bird makes seasonal incursions into the lowlands.

This dacnis is seen most often in semi-open situations, such as clearings with trees or shaded plantations in wooded regions, but it also frequents thinned woodland. Occurring in groups of several to bands of 15 or more individuals, seldom singly, it is found at all heights in the trees, usually upward from 20 or 30 feet. More active even than *cayana*, it behaves more like an arboreal warbler and a branch-peering tanager than a blossom-probing honeycreeper. The only notes that I have heard are a metallic "urp," "zirp," "rit," or "wurt" and a buzzy "wuzt" or "rezt."

Coereba flaveola (Linnaeus)

BANANAQUIT

RANGE: Southern Mexico to Bolivia and extreme northeastern Argentina; West Indies.

Coereba flaveola mexicana (Sclater)

RANGE: Southern Mexico to western Panama.

Except for the Tropical Dry Forest, the species is distributed over most of the country from sea level to the lower montane belt (in the central highlands), but is not common above the lower subtropical belt. Though occurring mainly in humid-forested regions, it enters hardly if at all into solid high forest. It is primarily an inhabitant of the overgrown semi-open and is most common in shaded plantations, hedges and shrubbery, forest edges, and broken woodland. I also found it common in the mangroves at the head of the Golfo Dulce.

It is met usually singly or in two's or three's, occasionally in small flocks. It is seen most often in flowering shrubs, shrubbery, and small trees, often beside houses, but it also rises higher in tall trees. It is attracted to blossoming low vegetation as are hummingbirds, feeding mostly on the contents of the flowers to which it clings. It has several variable, thin-noted, warbler-like, tanager-like, or hummingbird-like calls, often twittering and complicated with buzzy notes.

FAMILY PARULIDAE

Mniotilta varia (Linnaeus)

BLACK-AND-WHITE WARBLER

RANGE: Breeds in eastern North America; winters from southern Texas and Florida to Ecuador and Venezuela, also in West Indies.

This is a fairly common wintering migrant over much of Costa Rica to some 7000 feet in elevation and in migration to at least 8500 feet. Its fall arrival is much more strongly marked than its spring departure. It begins to arrive early in August but becomes conspicuous later in the month and in September; it is mostly gone by the end of March though present into April. During the winter it may occur, irregularly, almost anywhere except treeless areas and the depths of heavy woodland. It does enter openings or dips in

the canopy in forest, both in migration and in the winter, mostly in the company of mixed bands of small birds, including other wood warblers. Otherwise it is of solitary disposition and encountered usually singly, just often enough to be welcomed each time.

The Black-and-white generally forages below medium heights shaded by the branches and leaves in trees. An active bird, its specialized habits make it appear slow-moving compared to other arboreal warblers. Whereas the others flit and flutter amid the foliage, the Black-and-white creeps on the bark and examines mossy patches and crevices; it tends to explore branches and limbs rather than vertical trunks. Not only does it seldom climb trunks, but it does not go down them head first or use its soft tail as a prop. It moves in spurts marked every couple of inches by a sideways turning to search the side of the branch, or, scrutinizing its under side, the bird may even cling upside down. When it flits to another branch, it resumes where it had left off. Should the efficiency of the search match the speed at which it is conducted, not a grub in its hiding place should remain overlooked. From time to time, as do other small arboreal birds, it plucks prey from a leaf by stretching its neck or while hovering.

In Costa Rica the bird can for all practical purposes be considered voiceless. It does possess a weak chip which, however, is given seldom and is of such commonplace character that often it cannot be assigned to this species over a neighboring one.

***Protonotaria citrea* (Boddaert)**

PROTHONOTARY WARBLER

RANGE: Breeds in eastern United States; winters from southern Mexico to northwestern Ecuador and Venezuela.

This migrant warbler is seen seldom in transience although recorded from the lowlands the length of both sides of the country, the central plateau, and the lower slope of Turrialba Volcano. The fall migration is much better marked than the spring. The species first appears by the end of August and has been reported most often in October; the records are too few by which to establish a pattern of arrival. It is seldom observed in

the spring, when it seems to be gone by the last week of April.

During migration I have seen the Prothonotary only near water, either along the banks of rivers and the larger streams or in trees in the nearby semi-open, where its behavior does not differ from that of other arboreal warblers. In the winter it is rather common and can be found regularly in the Pacific mangroves, in which it is highly sedentary and evidently confined. It keeps low in the mangroves and associated vegetation, where it is to be seen singly but perhaps occurs in separated two's. It moves about rather slowly for a warbler, examining leaves, inserting its bill into or pulling at possibly productive hiding places, and sometimes it goes to the ground. The only note I heard was a sort of "hist."

***Helmitheros vermivorus* (Gmelin)**

WORM-EATING WARBLER

RANGE: Breeds in eastern United States; winters from Mexico to Panama, also in West Indies.

The Worm-eating Warbler is an uncommon to rarely seen visitant. It begins to arrive by the last week in August and departs by the end of March. It is known from the Caribbean lowlands, the central plateau (especially its eastern approach along the upper Reventazón Valley), the northwestern divide, and the southwest. The localities lie mostly in the upper tropical and lower subtropical belts, exclusive of the Tropical Dry Forest.

Apparently the species is most apt to be found along the Pacific foothills. In addition to several records from the General-Térraba region at upper tropical-belt elevations, I found it a few times also in the vicinity of Lake Arenal during January. It seems to prefer or perhaps only occurs in tall, heavily shaded woods, where it forages low in trees, in undergrowth, and on the ground.

Because I met it so seldom I cannot make a pat generalization. The bird is seen singly or in two's, with other species or not. In several places I found an individual or two accompanying mixed bands of greenlets, antwrens, and other birds. In another locality I found it several times only in association with and acting as a member of pure bands of the

warbler *Basileuterus tristriatus*, which it strongly resembles in appearance. Another occasion, I saw two birds that seemed to be paired and quite alone on the ground. At no time did I hear this species make a sound.

***Vermivora chrysoptera* (Linnaeus)**

GOLDEN-WINGED WARBLER

RANGE: Breeds in eastern North America; winters from southern Mexico to Colombia and Venezuela.

The Golden-winged Warbler is a fairly common migrant in the fall, less so in the spring, and rather common in winter. It arrives by early September, but is not seen regularly until later in the month, and remains at least until the third week of April. It is rather evenly distributed and met most often on the Caribbean slope, from the lowlands well into the subtropical belt and, in the central highlands, to the lower montane belt. It is very uncommon on the agricultural central plateau, fairly common along the northwestern divide, that is, north from the Arenal gap. Except for a report from Nicoya, it is absent from the Tropical Dry Forest. In the southwest it is fairly common in the upper tropical and lower subtropical belts on the approaches and lower slopes of the Talamanca Cordillera; it is not yet known from the lower tropical belt.

The species occurs singly as a rule, but several individuals may be spaced well apart. Preferring the humid life zones, it frequents forest borders and the neighboring tree-scattered semi-open. Sometimes it is seen high in the trees inside forest, usually accompanying a mixed bird party. Outside the forest proper it generally forages below medium heights in the trees and in shrubby vegetation, sometimes in brush; it drops to the ground occasionally. A tail-flashing arboreal warbler, it clings habitually to dead leaves, which it examines for prey. Sometimes it stands nervously on a branchlet, twisting its entire body and especially its tail in wide side-to-side jerks. Its only note here on the wintering grounds is a short "chup."

The hybrid Brewster's Warbler (*chrysoptera* × *pinus*) has been collected once (A.M.N.H. No. 392172), September 27, 1920, by Austin Smith at Bonilla (altitude

2000 feet) on the eastern slope of Turrialba Volcano.

***Vermivora pinus* (Linnaeus)**

BLUE-WINGED WARBLER

RANGE: Breeds in eastern United States; winters chiefly from southern Mexico to Nicaragua, also south to Colombia.

The only previous reports of the Blue-winged Warbler were by Austin Smith, who found two birds September 8, 1920, at Bonilla (altitude approximately 2000 feet) above Peralta Station, and by me near Puerto Viejo de Sarapiquí (Slud, 1960, pp. 62, 109). Thus far the species is known exclusively from the lower Caribbean slope, where its status is that of a very uncommon wintering migrant. The individuals reported by Smith and those seen by me in the fall and spring may have been visitants rather than transients. At any rate, the extreme dates, so far as known, are the third week of September and the third week of April.

I met the Blue-winged usually singly but also in two's in the southeastern, east-central and northeastern lowlands, each time in a cacao plantation in a generally forested area. My observations, though infrequent, were sufficiently similar to warrant the following generalization on the behavior of the species in the winter. In contrast to its slow-paced activity on its breeding grounds in the north, the Blue-winged seems to be just as active as are migrant arboreal warblers in general in Costa Rica. Though not obviously shy, it forages so busily in the shrubs and low trees that it continually flashes out of sight. It flits and dashes about as do other warblers, yet exhibits a definite tendency to seek its prey by hovering under leaves and, especially, by clinging to them. In the fall I found it associating with other tree-foraging warblers and, like most of them, well below the tops in tall trees and more often in trees of medium height or low ones. Its note resembles that produced by an unoiled little hinge: "skwik," "swik," "swirk," or "sirk"; it may be repeated.

***Vermivora peregrina* (Wilson)**

TENNESSEE WARBLER

RANGE: Breeds in Canada and northern United States; winters from southern Mex-

ico to Colombia and Venezuela.

The migrant Tennessee Warbler settles over most of the country from sea level to the lower montane belt, even to the montane belt in the central highlands. It begins to arrive by the end of August, but is not seen commonly until September, and departs by the latter part of April. It can occur almost everywhere outside solid forest, in Guana-caste during the dry season as on the Caribbean side in the rainy, and be almost as abundant at high elevations as at low. Though met regularly, its numbers fluctuate enormously in some places.

Varied conduct goes hand in hand with the wide environmental tolerance of this bird. Usually it travels about in pure bands, seldom alone. No other common wintering warbler moves in bands through the trees, although two species do wander about in groups through tangled ground cover or close to the ground in the open. It forages in trees and shrubs at low to medium heights, but it may rise considerably higher, sometimes searching bare twigs in the treetops. In foliage it flits, fly-catches, or flutters for prey, and shows a strong tendency to cling to leaves. It goes to the ground in open places, where its appearance and actions, especially when in small flocks, bring to mind greenish grassquits. Its only note, given freely, often constantly, is a characterless weak "tsit" or "wst," occasionally strengthened to approximate that of the Yellow and Chestnut-sided Warblers.

***Vermivora gutturalis* (Cabanis)**

IRAZÚ WARBLER

RANGE: Costa Rica and western Panama.

The Irazú Warbler is resident at high altitudes on the mountains that enclose the plateau region, the Dota Mountains, and the Talamanca Cordillera; it is not known from the northwestern divide. Centered in the lower montane and montane belts upward from approximately 5500 feet to timber line and even higher into the scrub, occasionally descending, probably seasonally, to the upper subtropical belt, it is a member of the wet highland avifauna rather than associated with a particular versant.

It frequents breaks in and borders of woodland, such as ridges, ravines, and edges of the

parklike pastures. A very active bird, it evidently travels about, perhaps in regular foraging rounds, in two's and in small groups usually fairly high in the trees. Above the limits of trees, however, I have seen it foraging very low in dense stiff scrubby growth where I would expect a wren. In common with other *Vermivora* in Costa Rica, it forages often by clinging to leaves, sometimes a few feet from the observer. The only sort of note I have heard is a thin and weak, short "tsn."

***Parula americana* (Linnaeus)**

PARULA WARBLER

RANGE: Breeds in eastern North America; winters chiefly in West Indies, also Mexico to Nicaragua; recorded in Costa Rica.

The Parula Warbler, a migrant, is known in Costa Rica only from the report by Austin Smith (1934), who collected a female October 24, 1933, at Villa Quesada, which is situated in the subtropical belt on the northwestern approach to Poás Volcano. I do not know where this specimen is housed. The status of the species is that of an accidental or a rare wanderer.

***Parula pitiayumi* (Vieillot)**

PITIAYUMI WARBLER

RANGE: Southern Texas to Bolivia and northern Argentina.

***Parula pitiayumi speciosa* (Ridgway)**

RANGE: Nicaragua to western Panama.

The native Pitiayumi Warbler is common in the subtropical belt the length of the country on both slopes, more so on the Caribbean than on the Pacific. It rises in lessening numbers to the upper limits of the lower montane belt. Downward it becomes rare below the lower limits of the subtropical belt, approximately the 2000-foot mark in many places. An extraordinary record is one from Las Agujas (altitude 50 feet) on the mainland coast at the entrance to the Gulf of Nicoya. In the northwest it is present in relatively small numbers along both sides of the continental divide. In the southwest it is common to abundant, at least locally, above 3000 feet along the Talamanca Cordillera. It has not been recorded from the southeast, where it is undoubtedly present in the foot-

hills. It is absent from the central plateau and the slopes that rise from it.

The species is usually seen alone or in separated two's, but a number of dispersed individuals may inhabit an area. Though nearly confined to generally wooded and heavily forested humid regions, it occurs for the most part at breaks and openings in woodland, in thinned woods, and along edges, cuts, and trails. It regularly enters or, probably, is resident in shaded plantations. The bird also visits trees in the more open parts of the semi-open. It forages mostly in the crowns of medium-sized trees rather than in tall ones. Small in size even for a warbler, it is generally hidden from sight in the foliage. Creeping and hopping about actively, it nevertheless lacks the restlessness of arboreal warblers in general. Whereas the others flit, fly-catch, and dash about, the Pitiayumi may loiter in a tree for lengthy periods. Confining itself to a small field of operations, it approaches a gnatcatcher or wren in behavior. The bird usually reveals its presence by its song.

The song is given as persistently as are the call notes of other birds. Typically that of an unmusical warbler, something like "see-see-see-see-see-dtrrrrrf," it is similar to that of the Blackburnian Warbler in the north. Two-part, it changes in pitch and increases in speed halfway through or toward the end, without a break in the continuity. Among sympatric native birds the song of the wren *Troglodytes ochraceus* is rather similar though not two-parted. Also given are sharp little "chit" 's, singly or run together as a hummingbird-like twitter.

***Dendroica petechia* (Linnaeus)**

YELLOW, GOLDEN, AND MANGROVE WARBLERS

RANGE: Breeds in North, Central, and northern South America, West Indies, Trinidad, and Galapagos Islands; winters in part from Mexico to Peru and Brazil.

YELLOW WARBLERS

***Dendroica petechia rubiginosa* (Pallas)**

RANGE: Breeds in northwestern North America; winters from Mexico to western Panama.

***Dendroica petechia amnicola* Batchelder**

RANGE: Breeds from Alaska to Labrador and Newfoundland; winters from southern Mexico to northern South America.

***Dendroica petechia aestiva* (Gmelin)**

RANGE: Breeds in eastern North America; winters from Mexico to Peru and Brazil.

***Dendroica petechia morcomi* Coale**

RANGE: Breeds in western North America; winters from Mexico to northern South America.

[*Dendroica petechia sonorana* Brewster]

RANGE: Breeds from southwestern United States through northwestern Mexico; winters from Mexico to northwestern South America.]

Any Yellow Warbler that breeds in North America would have to migrate through Costa Rica to its wintering grounds. Only *sonorana* seems not to have been recorded, whereas one or more Costa Rican specimens of the other races have been so identified in museums. The most common form in Costa Rica is undoubtedly *aestiva*. Yellow Warblers begin to arrive by the second half of August, become very common in September, and depart by the second week of May. In winter they are among the most noticeable and abundant birds in suitable habitat from both coasts to somewhat above the central plateau.

The birds avoid forest and are largely or entirely absent from the immediate vicinity of extensive wooded regions. Where agricultural inroads have been made, however, they may stay for the winter. Preferring the semi-open, they frequent plantations, overgrown clearings, agricultural lands, shrubbery, doorway hedges, gardens, and scrubby vegetation. Usually they are seen singly as they flit about in the low growth. The notes regularly given are a rather strong chip (between "chip" and "chep"), a weaker "sit," "tsit," or "twist," and a still weaker "tsint." In the spring (April 20) I once observed two brightly plumaged males acting aggressively toward each other and making scratchy "angry" sounds.

MANGROVE WARBLERS

Dendroica petechia bryanti Ridgway

RANGE: Eastern Mexico to Caribbean Costa Rica.

Dendroica petechia xanthotera Todd

RANGE: Pacific coast from Guatemala to Costa Rica.

Mangrove Warblers in Costa Rica are resident in the mangroves and thickets that border beaches and estuaries, from which they never seem to stray. The Caribbean *bryanti* is known only from the vicinity of Puerto Limón, including Isla Uvita, and from the mouth of the Río Matina, though it probably occurs northward in suitable habitat to the Río San Juan. On the Pacific side the race *xanthotera* is distributed the length of the coast, southward from the head of the Gulf of Nicoya.

Confining my remarks to *xanthotera*, I found it highly sedentary in thinly dispersed, apparently territorial pairs. Keeping low, it is shy and usually very hard to see in thickety cover, not in mangroves proper and brush; it may occur near and on the ground as well as 40 feet up in the trees. Its short and rapid Yellow-Warbler-like song, something like "cht cht chichirweé," strongly resembles, among native birds, the spirited phrase of the wren *Thryothorus rutilus*. The chip of the Mangrove is heavier than that of the migrant Yellow Warblers, which often occur with it.

Dendroica magnolia (Wilson)

MAGNOLIA WARBLER

RANGE: Breeds in eastern North America; winters from Mexico to Panama, also in West Indies; recorded in Colombia.

Previously recorded only once, the Magnolia Warbler is apparently a regular but quite uncommon migrant in Costa Rica, where I met it at seven localities. Its inadequately known distribution includes the lowlands and foothills the length and breadth of the Caribbean slope, the northwestern divide, and the head and mainland shore of the Gulf of Nicoya in the Tropical Dry Forest. It remains unrecorded from the central plateau and all the southwest, in both of which re-

gions it undoubtedly occurs from time to time. My meetings with it, though few, suggest that it is a thinly dispersed visitant at the lower elevations over most of the country.

The species arrives in October, or possibly earlier, and remains until the latter part of April, or perhaps later. I found it only singly in country of plantation type and in cutover vegetation not enclosed by stands of trees, from eye level and shrub height to below medium heights in medium-sized trees. I noted no behavioral trait that might tend to separate it from other arboreal warblers. It has a rather arresting metallic call note.

Dendroica tigrina (Gmelin)

CAPE MAY WARBLER

RANGE: Breeds in northern North America; winters chiefly in West Indies, rarely on mainland Middle America.

The Cape May Warbler seems not to have been recorded in Central America before the early 1950's. In the past decade, however, it has been found in Nicaragua (Howell, 1958), Costa Rica (Slud, 1957c), and northwestern Panama (Eisenmann, 1962, oral communication). The species appears to be an accidental or at best an irregular wanderer to southern Central America.

I observed the bird twice in Costa Rica. My first record was of a single bird near Barranca beside the Pacific coast in the latter part of November. This individual was foraging in a line of shrubs along the edge of a field covered with new second-growth vegetation. In December of another year I encountered the species twice, as a group of two, and another of at least six, individuals, near the town of Turrialba on the Caribbean slope. These birds were foraging well up in thickly foliated trees along the wooded edge of a river gorge.

Dendroica coronata (Linnaeus)

MYRTLE WARBLER

RANGE: Breeds in northern North America; winters south to Panama, also in West Indies; recorded in Colombia.

[*Dendroica coronata hooveri* McGregor

RANGE: Breeds in Alaska and northwestern Canada; winters from western and

southern United States to Panama; not recorded from Costa Rica.]

***Dendroica coronata coronata* (Linnaeus)**

RANGE: Breeds in northeastern North America; winters from eastern United States to Panama and West Indies, recorded in Colombia.

The Myrtle Warbler in transience is seen seldom and singly in diverse environmental situations. It arrives late in the fall, apparently not before October, and leaves early in the spring, hardly later than the end of March, when I collected a very fat female with enlarged ovaries. In winter, however, it is tolerably common in general, although sporadic at a particular site. Thus, from approximately the end of November to early March, it occurs as a rule in groups of three or four individuals to flock-sized aggregations that roam widely, possibly over the entire country, and are apt to appear almost anywhere for longer or shorter periods. Frequenting semi-open and open country, keeping low in grasses, bushes, shrubbery, and small trees, the bands may occur temporarily in deforested and agricultural areas in the subtropical belt along the Cordillera Central, occasionally on the central plateau, regularly in fields and savannas in the southwest and the scrubby and dry northwest, even in clearings in the largely forested northeastern lowlands, but not inside any sort of woodland.

When in fields and other cultivated areas, or perched sideways on a stem, or sitting on a fence, the streaked birds may bring to mind a flock of sparrows both in appearance and behavior. A member of the group may rise high in a tree to take nectar or examine bare twigs in the manner of certain tanagers, warblers, and honeycreepers. A common pose is one in which the wings are held like arms a little away from the sides of the body and their tips below the base of the tail. Flying as an integrated flock, the birds flash the white corners of their tails like a signal. The only note I have heard is a short "cht."

***Dendroica auduboni* (Townsend)**

AUDUBON'S WARBLER

RANGE: Breeds in western North America south to northwestern Mexico; winters to Guatemala; recorded in Costa Rica.

In a letter dated December 13, 1956, Mr. Frederick C. Lincoln of the Fish and Wildlife Service of the United States Department of the Interior wrote to me as follows: "We have records for this species from Barranca dating back to September 30, 1865. The other dates being September 29, September 20, March 15, October 4, and March 30, all in 1865. These have been taken from the Catalogue of the United States National Museum. Another card, also from the National Museum Catalogue, states that this bird winters in Barranca and that specimens were taken at San Jose on September 22 and August 22, 1864. The most modern record is one reported to us viva voce by C. H. Rogers."

Apart from what seems to have been an outbreak of the species in 1864-1865, the only report for Costa Rica is that of Charles H. Rogers. Mr. Rogers kindly lent to me his notes and the color drawing that he made, on the spot, of a male unquestionably of this species. During his stay at Juan Viñas from February 17 to March 23, 1912, he observed one bird the morning of February 19 and two birds the following morning. The birds were near the ground in bushy places along the Juan Viñas River, which is hardly more than a brook, in open country at the edge of the village. Several other species of wintering warblers, including Myrtles, were also present.

The status of the species in Costa Rica appears to be that of an accidental or rare, highly irregular wanderer. Juan Viñas is situated in the subtropical belt at the Caribbean edge of the plateau region. The other locality, Barranca, is undoubtedly the one in the lower montane belt at the western end of the Cordillera Central rather than the one on the Pacific shore near Puntarenas.

***Dendroica virens* (Gmelin)**

BLACK-THROATED GREEN WARBLER

RANGE: Breeds in eastern North America; winters from the Gulf coast of the United States to the West Indies and Panama; recorded in Colombia.

***Dendroica virens virens* (Gmelin)**

RANGE: Same as that of the species, excluding southeastern coastal United States. The migrant Black-throated Green Warbler arrives mostly in October and is gone by

about the middle of April. A highland bird, it may show up occasionally during migration almost anywhere in the Caribbean lowlands, perhaps also in the Pacific southwest. In the winter it is found commonly throughout the central highlands, mostly above the central plateau to timber line. It also occurs upward from the lower limits of the subtropical belt along the Guanacaste Cordillera, probably also the Cordillera de Tilarán, and from about the middle of the subtropical belt up the Talamanca Cordillera.

Though encountered regularly, at least in the central part of the country, not more than one or two individuals are seen at a time. The habitat requirements, provided they are fulfilled in the higher, cooler parts of the country, are simple: any place with trees. The bird may occur high or low in tree-scattered, park-like pastures and clearings or in high crowns in the forested mountainous terrain. It dwells of necessity in broad-leaved vegetation, as there is no other. Its habits are typically those of an active arboreal warbler. During migration, however, I have seen the bird very low, sometimes on the ground. The only note given sounds like "tsip" or "tsööp."

Dendroica cerulea (Wilson)

CERULEAN WARBLER

RANGE: Breeds in eastern United States; winters from Colombia and Venezuela to Peru and Bolivia.

The Cerulean Warbler is seen in Costa Rica only in fall transience to its wintering grounds in South America; there are no winter records. The only spring record, that of a male marked by Underwood as taken in June, 1919, in the vicinity of San José, I consider of doubtful validity. The bird passes through the central highlands and, especially, the Caribbean lowlands, but apparently not the Pacific slope. It begins to arrive in the first half of August, but is not likely to be seen commonly until the latter part of the month and in September. It can still be met throughout October and even into November.

Sometimes it is found alone, more often in small "waves" that may settle for several days in a given locality before disappearing. The individuals keep loosely associated and mingle freely with other species. The Cerulean prefers semi-open country, including

shaded plantations, thinned woodland, and edges, to deep forest or field habitat. Its habits seem no different from those of other migrant arboreal warblers that, flitting and hovering, are always busily seeking food high or low in the trees. It does not seem to be shy, but its constant activity in leafy branches makes it hard to observe. For the same reason its note, a kissing "tsip," is difficult to isolate from the similar ones of neighboring birds.

Dendroica fusca (Müller)

BLACKBURNIAN WARBLER

RANGE: Breeds in eastern North America; winters from Guatemala to Peru and Venezuela.

The Blackburnian Warbler begins to arrive before the middle of August, but becomes numerous in September and October, especially on the Caribbean side, both in the lowlands and along the rising slopes. It does not seem to migrate much below the subtropical belt along the Talamanca Cordillera in the southwest, but I found it down at sea level in the subhumid Puntarenas-Barranca district. It is mostly if not entirely gone from the country by the end of April. The fall migration, unlike the spring, is very strongly marked as the species arrives in country of plantation type in "waves." The birds linger, disappear, and are soon replaced by a fresh "wave." As a winter visitant, it is fairly common in the upper part of the subtropical and the lower montane belts. It is most abundant in the central highlands, especially the slopes that rise from the central plateau and the Caribbean versant of the Cordillera Central. It is present, too, along the Talamanca Cordillera, the Guanacaste Cordillera, and almost certainly the Cordillera de Tilarán and the Dota Mountains.

During migration I do not recall seeing more than an isolated individual, invariably accompanying a traveling band, well inside solid forest. As a visitant in the highlands, the bird is also met, as a rule, singly in tree-scattered clearings, parklike pastures, and along edges and breaks in and beside woodland. Very active at all heights in the trees, it habitually falls flutteringly from a leafy limb, probably in pursuit of prey, then shoots back into the foliage.

Its usual note is a sort of "ss·tsip." From a migrating band foraging during a rainstorm I heard series of sibilant "tsn" 's, like the dangling of many little chains. Once in October, but never again, I happened to hear the full song given frequently by migrating males.

***Dendroica dominica* (Linnaeus)**

YELLOW-THROATED WARBLER

RANGE: Breeds in eastern United States and Bahamas; winters from southeastern United States to Costa Rica and West Indies.

***Dendroica dominica albilora* Ridgway**

RANGE: Breeds in east-central United States; winters from southern Texas to Costa Rica, also in Cuba and Jamaica.

The Yellow-throated Warbler is probably a regular though seldom-seen visitant that arrives in September and leaves by an unknown date in the spring. There seem to be only three earlier reports, all from the central plateau. Also, Robert MacArthur (personal communication) twice saw a bird in low trees on the streets of San José during the winter of 1956-1957.

I found the species only twice. The first time, two birds were foraging together among the fronds in a coconut grove on a Pacific beach (near Parrita). The second time, I saw one bird in the shrubs of a parklike area at 2000 feet on the Caribbean slope (near Turrialba). The birds in the palms foraged mostly by creeping and flitting. The one in leafy vegetation behaved no differently from other warblers in similar situations. Evidently the species may turn up almost anywhere outside woodland, is rather tame, seems to prefer shrubs and low trees, and perhaps tends to creep and explore patiently.

***Dendroica pensylvanica* (Linnaeus)**

CHESTNUT-SIDED WARBLER

RANGE: Breeds in eastern North America; winters principally from Nicaragua to Panama, recorded in Colombia and Venezuela.

The Chestnut-sided is one of the most common wintering warblers, at least as abundant as the Yellow or the Tennessee. It occurs almost everywhere in the lowlands, though it is scarce in the dry-forested northwest, and rises in diminishing numbers well into the

lower montane belt. A specimen dated August 9 by Underwood is unusually early, as the species is not seen regularly until the middle of September, when its numbers increase rapidly. An occasional bird is already changing into breeding plumage in early February. By the middle of March some individuals are almost in full summer dress, others are still in winter plumage, and by the end of the month spring-plumaged males begin to sing. A week later many birds are in full breeding plumage and may sing rather freely. The species remains widespread and plentiful until mid-April and is still met early in May.

Though occurring singly, never in bands, this warbler is to be seen almost too often. The species simply blankets the country. It inhabits plantations, second growth, thinned woods, gardens, and the like in the humid parts of the country. It does not enter forest, except occasionally a little behind the border. Generally it forages in low trees and shrubs and up to the crowns of medium-sized trees. It is fearless and may flit about close to the observer. It seems to be the only migrant arboreal warbler that habitually carries its tail half-cocked above the tips of its wings in the sprightly manner of a gnatcatcher. I find the song difficult to identify in Costa Rica; the phrases are jerky and resemble those of DeLattre's Warbler. The frequently given note is a fairly sharp "chip" or "tchrip."

***Dendroica castanea* (Wilson)**

BAY-BREASTED WARBLER

RANGE: Breeds in northeastern North America; winters from Costa Rica to Colombia and Venezuela.

The rarely recorded Bay-breasted Warbler is a common transient that occurs regularly each fall, thus far only in October, along the Caribbean slope, where I found it at five localities. It migrates singly and in small "waves" the length of the lowlands and also at subtropical elevations, as I met it once in the foothills that front the central highlands. This last was a spring observation made the third week of April on a 3000-foot ridge that overlooks the Reventazón Valley. The bird is evidently very uncommon or local in winter, when I found it at only two sites. Thus, I ob-

served a few sedentary, lone individuals throughout the period from October to April in the northeastern lowlands. Some of these birds, incidentally, had acquired nearly full breeding plumage by the first part of April. The other site was in the Pacific southwest, where I met one bird February 17 in opened woodland at 1500 feet beside the Coto Brus Valley.

Apparently the species prefers humid-forested regions in which it frequents the forest borders, the shaded semi-open beside forest, and shaded riversides. It is strictly arboreal, generally keeping at medium heights or higher in the trees, often lower along river banks. It seems to be just as active as other arboreal warblers. On one occasion I found it with other sorts of birds attracted to army ants. I do not recall ever hearing it in Costa Rica.

[*Dendroica discolor* (Vieillot)

PRAIRIE WARBLER

RANGE: Breeds in eastern United States; winters from Florida through islands in Caribbean Sea; rare on mainland Middle America, recorded in El Salvador.

The nominate race winters in northeastern Costa Rica according to the Mexican check list (Miller and others, 1957, p. 255). I can find no supporting evidence for the above statement, which is almost unquestionably in error. The species should be struck even from the hypothetical list.]

Seiurus aurocapillus (Linnaeus)

NORTH AMERICAN OVENBIRD

RANGE: Breeds chiefly east of Rocky Mountains in North America; winters from southeastern United States, the Gulf coast, and West Indies to Colombia and Venezuela.

Seiurus aurocapillus aurocapillus (Linnaeus)

RANGE: Breeds in eastern North America; winters from southeastern United States, Gulf coast, and West Indies to Colombia and Venezuela.

Seiurus aurocapillus furvior Batchelder

RANGE: Breeds in Newfoundland; winters from Guatemala to Panama, also in Cuba and Bahamas.

Seiurus aurocapillus cinereus Miller

RANGE: Breeds along eastern slope of Rocky Mountains; winters south to Costa Rica.

This migrant warbler, on arrival late in the fall, slips into the country, so to speak, apparently not before October and remains until the latter part of April or early May. Represented almost entirely by the nominate race, the species in the winter is fairly common from both humid coasts upward to the plateau region; it is least common in the Tropical Dry Forest. It lives mostly in wooded tracts, including scrubby woodland, dry and wet forest, and tangled second growth. Individual birds are as a rule well separated from one another and seen singly, almost always in shaded surroundings.

The bird is semiterrestrial in shrubbery, undergrowth, and the woodland understory. It is the only migrant bird that walks about on the forest floor. Sometimes it shows a preference for wet places in forest or muddy places covered by leafy herbaceous growth, and it may also be found in dried-up woodland on the Pacific side. Perched, it often juts its hindquarters as does a waterthrush. Walking, it bobs its head and habitually flicks its partially cocked tail, when it resembles a terrestrial antbird colored and patterned like a thrush. Often it makes its presence known through its call note, a sharp "tsick," or, especially toward evening, a continual chipping.

Seiurus noveboracensis (Gmelin)

NORTHERN WATERTHRUSH

RANGE: Breeds in northern North America; winters from Mexico to Peru and the Guianas, also in West Indies.

Seiurus noveboracensis notabilis Ridgway

RANGE: Breeds in northern North America; winters from Mexico to Ecuador and the Guianas, also in West Indies.

Seiurus noveboracensis noveboracensis (Gmelin)

RANGE: Breeds in northeastern United States; winters from Mexico to Peru and the Guianas, also in West Indies.

Seiurus noveboracensis linnaeus

McCabe and Miller

RANGE: Breeds in British Columbia; winters from southern Baja California to Panama and Colombia.

The Northern Waterthrush, which arrives by mid-August and remains until the end of May, is abundant in the fall, fairly common in the winter, and common in the spring. The nominate race appears to be the one that winters commonly in Costa Rica. Personally I cannot, as with the preceding species, confidently identify subspecifically specimens taken here on the wintering grounds. The species inhabits the entire country from both coasts inland to the central plateau, above which its numbers dwindle rapidly. In general, it seems to be more common on the Caribbean slope than the Pacific and at the lower elevations than the higher. It inhabits the shores of all the rivers that pass through forest or not, as well as streams outside solid forest; occasionally it is met in the semi-open.

The bird is solitary and, in the winter, apparently sedentary. Possibly the scattered individuals each maintain a feeding territory. I have seen it mingle with other birds only when attracted to army ants. Largely terrestrial, it walks and hops, but it also rises to low branches and vines. It teeters its hindquarters and jets its tail almost continuously, even while bathing. Surprised or disturbed, the bird emits its hard "tsick" and takes to low, dipping flight in a semicircular course, when it looks entirely very dark brown, to vanish from sight. Otherwise it bears a resemblance to the Spotted Sandpiper in habitat, actions, and general appearance.

***Seiurus motacilla* (Vieillot)**

LOUISIANA WATERTHRUSH

RANGE: Breeds in eastern United States; winters from Mexico to Colombia and Venezuela, also in West Indies.

The distribution and habits of the Louisiana Waterthrush hardly differ from those of *noveboracensis*, except that the former is not encountered so often and it occurs occasionally well inside forest. Its migration in the fall is much better marked than that in the spring. The bird begins to arrive by the end of

August, when it has even been taken high on Irazú Volcano, and is mostly gone from the country by the end of March, so that its winter residence is shorter than that of *noveboracensis*. It is solitary, almost entirely terrestrial, and tends to spread to more heavily forested environments than *noveboracensis*. Both species, incidentally, are partial to mangroves. The Louisiana hops, walks, and also runs. I have seen it flick aside dead leaves, but neither this mannerism nor its attraction to army ants is habitual. Once in early September I encountered what may have been a freshly arrived migrant singing repeatedly as it walked along a muddy forest trail. This song I transcribed as "pss pss pss wíchita wíchita." Its hard call note sounds like that of *noveboracensis*.

***Oporornis formosus* (Wilson)**

KENTUCKY WARBLER

RANGE: Breeds in eastern United States; winters from Mexico to Colombia and Venezuela.

The Kentucky Warbler is a regular and fairly common to very common visitant. It begins to arrive apparently not before the latter part of September and remains until approximately mid-April. Except for the Tropical Dry Forest, whence it has been recorded, once, beside the entrance to the Gulf of Nicoya, it occurs the length of the country from both coasts to at least the altitudes of the plateau region, where it is accidental. It is seldom met higher than 3000 feet or so, yet I found it abundant at 4400 feet in the far southwest next to Panama. Typically it inhabits humid virgin forest, where it forages like a wren in undergrowth and brush and also like an antbird on the floor. It occurs, too, in thinned and second-growth woodland and in wild shrubbery that borders the forest.

A solitary, shy, and retiring bird, it is seen as a flash of yellow when hopping and flitting through the low cover. Usually its presence is indicated by the repeated call note. Discovered on a branch, the bird may respond by freezing, as does the warbler *Seiurus aurocapillus* or a nightingale thrush, yet expresses overtly an inner alarm through a limited waterthrush-like jetting of its tail. Thus posed at attention, the bird is seen to be

rather long-legged and standing rather than perched or sitting. Its crown feathers may be weakly erected, but such is often the normal condition. Afoot it moves in lively hops, leaps from time to time to snatch grubs or other prey from the under sides of green leaves, or pokes its head under fallen dead ones.

Its call note, between "(s)tchup" and "(s)tchp," given regularly, often frequently and repetitively, is sufficiently distinctive to identify the bird sight unseen, especially in forest.

Oporornis philadelphia (Wilson)

MOURNING WARBLER

RANGE: Breeds in eastern North America; winters from Nicaragua to Ecuador and Venezuela.

Arriving in Costa Rica by early September, this migrant warbler becomes common later in the month and remains to mid-May. In the winter it is generally common in the humid life zones on both slopes in the tropical and lower subtropical belts, hardly higher, the length of the country. I found it in the winter in the lower Tempisque basin; elsewhere in the Tropical Dry Forest it seems to be scarce or lacking. There are several records from the central plateau, but these apply to the period of migration in the fall.

The bird is solitary in the winter and in migration, though I once met a small band in October. With few exceptions it does not enter woodland and is uncommon in suitable habitat in extensively forested regions. It prefers low cover in the semi-open, such as wild shrubbery, matted grasses, and thickety growth, in which it moves about in concealment. It also occurs on the ground, where it forages by leaping at the under sides of overhanging leaves. Its note is an often recognizable "chip" or "chit," not clear but hard.

Oporornis tolmiei (Townsend)

MACGILLIVRAY'S WARBLER

RANGE: Breeds in western North America; winters from Mexico to western Panama.

Oporornis tolmiei tolmiei (Townsend)

RANGE: Breeds in northwestern North America; winters from Mexico to western Panama.

This seldom-seen species arrives in Costa Rica in September and leaves in May. It passes through the central highlands and also, it would appear, along the coasts, to judge from a record by Cherrie (M.N.C.R. No. 9007) at the mouth of the Río Matina. It is present in the winter evidently in very small numbers, mostly in the cool middle altitudes. It is known from the subtropical central plateau to the lower-montane slopes on both sides of the Cordillera Central, the Caribbean edge of the plateau region just within the lower limits of the subtropical belt, and, in the southwest, the upper tropical and subtropical belts the length of the Talamanca Cordillera. The bird is met singly, low in thickety or shrubby vegetation in semi-open situations, usually moving about rapidly in and out of the protective cover. Its habits and habitat parallel those of *philadelphia* if the latter were removed to the higher elevations. It also utters chips like those of *philadelphia*.

Geothlypis trichas (Linnaeus)

COMMON YELLOWTHROAT

RANGE: Breeds in North America and Mexico; winters to southern Central America, also in Bahamas and Greater Antilles; recorded in northern South America.

Geothlypis trichas brachidactylus (Swainson)

RANGE: Breeds in eastern North America; winters from southern Texas to Panama, also in Bahamas and Greater Antilles.

Geothlypis trichas trichas (Linnaeus)

RANGE: Breeds in southeastern United States; winters from Gulf coast of United States to Costa Rica, also in Bahamas and Greater Antilles; recorded in Colombia and Venezuela.

The Common Yellowthroat is an uncommon migrant, recorded from August to the end of April. An increase in the number of observers would doubtless result in an improvement of the numerical status of the bird. Apparently the race *brachidactylus*, as judged by the relative numbers of collected individuals, is the one more likely to occur in Costa Rica. The species has been found from sea level to the subtropical belt, primarily on the Caribbean slope, from the Río Frío region near

Lake Nicaragua to the Sixaola region beside Panama, also on the central plateau and in the General basin in the Pacific southwest. Most records coincide with the period of fall and spring migration, except a few from San José.

As on its breeding range in the north, its haunts in Costa Rica include brush, reeds, and bushy tangles in the protection of which the bird keeps close to the ground and is difficult to detect. Besides, it is solitary and represented mostly by plain-colored individuals. Except for its occasional "chep," the bird is silent.

***Geothlypis semiflava* Sclater**

BAIRD'S YELLOWTHROAT

RANGE: Honduras to northwestern Panama; western Colombia and western Ecuador.

***Geothlypis semiflava bairdi* Ridgway**

RANGE: Honduras to northwestern Panama.

The native Baird's Yellowthroat is distributed throughout the lowlands and foothills on the Caribbean slope. It rapidly diminishes in numbers above the lower portion of the subtropical belt, but rises to the upper limits of the belt very locally in the central highlands. It reaches the Pacific face of the northwestern divide, so far as known, only at the Arenal gap. Otherwise it is entirely absent from the Pacific slope.

Generally a common species, it lives in thick shrubby growth, brushy edges, and tangled grass and thickets in plantations, overgrown agricultural lands, and other semi-open, or semiclosed, areas rather than the more open situations favored by the congeneric and partly sympatric *poliocephala*. This habitat is the sort in which to expect a wren, and the behavior and call notes of the bird are wrenlike. Thus, it moves about nervously with cocked tail, usually inside dense cover. In a typical stance with its legs spread apart the bird appears inquisitive and alert as it grips a thin branch or clings to a grass stem, while its hindquarters, raised above the level of its head, jerk from side to side at each flick of the tail.

Its rambling lengthy song, while resembling that of several other birds, has two

distinctive features. First, the unmusical chirking notes, which are usually enunciated singly, range steplike up and down as an unpatterned singsong. Second, it almost always has a definitive terminating slur. Or, it may consist of two short, alternating, wren-like phrases. In addition to a protracted descending diagnostic "chchchchchch," and so on, the bird has at least five kinds of call notes.

***Geothlypis poliocephala* (Baird)**

CENTRAL AMERICAN YELLOWTHROAT

RANGE: Extreme southern Texas to western Panama.

[*Geothlypis poliocephala caninucha* Ridgway

RANGE: Southern Mexico to eastern Nicaragua, possibly to adjacent Costa Rica.]

***Geothlypis poliocephala icterotis* Ridgway**

RANGE: Western Nicaragua to central Costa Rica.

***Geothlypis poliocephala ridgwayi* (Griscom)**

RANGE: Southwestern Costa Rica and adjacent western Panama.

This resident yellowthroat has two centers of distribution in Costa Rica. The race *icterotis* ranges from western Nicaragua through the Pacific northwest (and possibly eastward to the Río Frío region) and across the central plateau, where it is common, down to about 1500 feet on the neighboring portion of the Caribbean slope, where it seems to be increasing numerically and perhaps extending its range. Though small in numbers and of spotty occurrence in the seasonally arid Guanacaste lowlands, it becomes remarkably abundant with increasing elevation in the grassy cattle lands that rise to the moist lower subtropical belt along the Guanacaste Cordillera. I found it also well up the Cordillera de Tilarán, probably as an extension from the central highlands. The race *ridgwayi* is centered in the "savannas" of the Térraba region in the southwest, where it is common locally.

The species prefers brushy or grassy fields, clearings, and open and semi-open country in general. An active bird, it is not always easy

to see, as it perches amid grass stems or keeps close to the ground and has the habit of diving into a grassy clump. Where locally abundant, however, it is apt to rise to the crown of a 30-foot tree. Close to or on the ground it may bring to mind a small finch, as may also its hedgehopping flight. Depending on its stance, whether upright or inclined, it may flick its rather spiky, narrow-webbed tail as does a phoebe or a waterthrush. Sometimes it engages in fly-catching.

Its varied calls are neither rich nor particularly musical, and none is easy to identify. The usual song is somewhat similar to that of *semiflava* and has a number of undistinctive vireo-like phrases strung together. It is not so long as that of *semiflava*, does not ramble up and down so markedly, and lacks a slur at the end although one may be thrown in elsewhere. A simpler downscale song is not unlike the descending one of the gnatcatcher *Poli-optila plumbea*. The bird has at least two other "songs" and half a dozen calls, some of them vireo-, sparrow-, saltator-, grosbeak-, or meadowlark-like.

***Icteria virens* (Linnaeus)**

YELLOW-BREASTED CHAT

RANGE: Breeds in North America and northern Mexico; winters from southern Texas to western Panama.

***Icteria virens virens* (Linnaeus)**

RANGE: Breeds in eastern United States; winters from Mexico to western Panama.

The Yellow-breasted Chat is very uncommon both in migration and in the winter. Judged solely by the few records and my own observations, it arrives in the country rather late, probably not before the latter part of September, and departs by mid-April. In the winter it has been found in the lowlands and foothills on the Caribbean slope, on the central plateau, and in the lower Térraba Valley in the southwest.

The bird seems to be highly sedentary, at least during part of its winter residence, and is quite solitary. It frequents dense shrubbery, hedges, thickety growth, and overgrown edges in the semi-open, either beside or well away from woodland. Staying within a yard or two of the ground, it moves about as a rule rather slowly in the dense cover. It remains still for lengthy pauses, twitching its

cocked tail and holding its wings stiffly at the sides of the body so that their tips are lower than the base of the tail. Occasionally it makes harsh notes, like those of the tanager *Ramphocelus passerinii*, for example, and a sibilant "sink" like that of *Saltator maximus*.

***Wilsonia citrina* (Boddaert)**

HOODED WARBLER

RANGE: Breeds in eastern United States; winters from Mexico to central Panama.

The Hooded Warbler in Costa Rica is known from only three localities in the lowlands and lower foothills of the northeastern Caribbean sector and a fourth in the Río Frío region of the northwestern Caribbean lowlands. Arriving early in October, or possibly before, and remaining at least until mid-April, the bird is evidently very scarce yet regular and local. Thus I found it in the spring and through the winter, respectively, in two different years at the same site in the Sarapiquí lowlands.

The bird frequents shrubs, shrubbery, and leafy thickets in the shaded semi-open, shaded river banks, intermediate second-growth woods, and overgrown forest borders in heavily wooded country. It is solitary and apparently sedentary, keeps within a few yards of the ground, and is not especially active. The few birds of both sexes seen in Costa Rica by me habitually scissored their tails which flashed as a white signal. The bird makes a weak "tsip" or "chip" and a somewhat stronger "chit," similar to the note of the Chestnut-sided Warbler.

***Wilsonia pusilla* (Wilson)**

WILSON'S WARBLER

RANGE: Breeds in North America; winters from Mexico to western Panama.

***Wilsonia pusilla pusilla* (Wilson)**

RANGE: Breeds in northeastern North America; winters from Mexico to Costa Rica.

***Wilsonia pusilla pileolata* (Pallas)**

RANGE: Breeds in western North America; winters from southern Texas to western Panama.

***Wilsonia pusilla chryseola* Ridgway**

RANGE: Breeds along Pacific coast of

North America; winters from western Mexico to western Panama.

Wilson's Warbler has been recorded as early as August 17 but is not seen in numbers until the middle of September. It remains in large part through April, and individuals are still met in the third week of May. In winter it is the most common North American migrant in the Costa Rican highlands, from the Guanacaste Cordillera to Panama. It is conspicuously abundant from above timber line down to about 4000 feet, gradually diminishes in numbers to 2500–3000 feet, below which it dwindles and is rare or accidental in the lower tropical belt. During migration, however, it is seen occasionally in the coastal lowlands.

The species occurs along edges, in thinned woodland, timbered patches, scrubby or brushy small clearings, and thickets and shrubbery, but uncommonly in forest, usually within a few yards of the ground. In patches of woodland, however, it may rise 50 feet in the trees. Many independent individuals may inhabit a particular area. If not bold this species is not, at any rate, shy, as it does not seek concealment. Exhibiting most kinds of warbler behavior, it flits, flutters, clings, climbs, and hops. Its frequent, often acrobatical fly-catching sallies are a watered imitation of those of the spectacular redstarts (*Setophaga* and *Myioborus*). Though lacking the sweep and flash of the latter, they are executed in high spirit. Like the redstarts, too, the bird may flick its tail, sometimes whipping it about, and holds the tips of its folded wings well separated a little below and away from the sides of the rump.

The usual, rather distinctive note is a scratchy "chek," "tsek," "chep," "chip," or "tsick," given singly or sometimes repeated. Some individuals are already singing in March and April. The song is a level series of short scratchy notes coming to a halting close. It has a simple woodpecker-like pattern and the mechanical "zicking" quality of certain arboreal ovenbirds.

***Wilsonia canadensis* (Linnaeus)**

CANADA WARBLER

RANGE: Breeds in eastern North America; winters chiefly in South America from Colom-

bia and northwestern Venezuela to eastern Peru.

The Canada Warbler, a transient, is abundant in the fall but uncommon to rare in the spring. Onward from its arrival in early September through October it may be seen, particularly in the Caribbean lowlands, on almost every bush. It is still met occasionally far into November. It migrates also over the central plateau, especially in October, even occurring sparsely well into the lower montane belt. I saw it several times during September in the dry-forested Puntarenas-Barraña district on the Pacific side and also farther south along the coast near Parrita. I presume it passes through the far southwest where, except in the Dota region, it is not recorded. In the spring it is occasional, from early April to early May, along the Caribbean slope from the lowlands well into the subtropical belt and has been recorded in April several times on the central plateau.

Single birds are sometimes seen inside forest, almost always with traveling mixed bands in the upper levels or perhaps fairly low at a break. But, for the most part, it is in Costa Rica a nonforest species generally occurring in shrubs, shrubbery, and small trees in the shaded semi-open, second growth of all sorts, and at overgrown forest borders. It may go down to brush, fallen branches, or even the ground, as when attracted to swarming army ants. It shows no sign of flock behavior. Though many birds may at times be close together, each is spaced apart from the next as an independent individual. It is very active in the manner of small arboreal birds, except that it does not cling to foliage. Its tail is often held partly cocked, flicked, and also scissored to flash its white patches. Often a highly animated individual stands on a twig and twists its body jerkily from side to side, as does the Kentucky Warbler, for example. Its note varies from "chick" or "check" to a sharp pebbly "sprit."

***Setophaga ruticilla* (Linnaeus)**

AMERICAN REDSTART

RANGE: Breeds in North America; winters from Mexico to Peru and northern Brazil, also in West Indies.

***Setophaga ruticilla tricolora* (Müller)**

RANGE: Breeds in northern North Amer-

ica; winters from Mexico to Ecuador and northern Brazil.

***Setophaga ruticilla ruticilla* (Linnaeus)**

RANGE: Breeds in eastern United States; winters from southern Mexico to Ecuador and the Guianas, also in West Indies.

The migrant American Redstart seems to be represented in Costa Rica mostly by *ruticilla*. The difficulty one finds in separating winter specimens perhaps accounts for the apparent scarceness of *tricolora*. The species arrives late in August (sometimes in mid-August), becomes common in September, less common in the winter, and uncommon in the spring. It leaves the country mostly in March, although individuals can be seen as late as mid-April. A specimen (M.N.C.R. No. 9386) dated July 2, 1897, I mention for the record.

As both a transient and visitant, it occurs over much of the country, from both coasts to the central plateau or, in the case of transients, even higher. The winter distribution is spotty. The bird may be fairly common in certain places but rare or lacking in others under apparently similar environmental conditions. In general, it avoids or is sparse in extensively forested regions (although occasionally seen in forest) and the higher middle altitudes, and it is uncommon in much of lowland Guanacaste. Perhaps it tends to be more abundant in the Térraba region than elsewhere.

It is usually found singly from medium levels in the trees down to shrub height in the shaded semi-open, second growth, and patches of woodland. An acrobatical, tail-fanning, fly-catching warbler, it also hops among branches, amid foliage, and clings momentarily to trunks. Its "chip," "tsip," or "stchit" resembles that, for example, of the Yellow Warbler.

***Myioborus miniatus* (Swainson)**

SLATE-THROATED REDSTART

RANGE: Mexico to Bolivia and northern Brazil.

***Myioborus miniatus comptus* Wetmore**

RANGE: Northwestern and central Costa Rica.

***Myioborus miniatus aurantiacus* (Baird)**

RANGE: Southern Costa Rica and western Panama.

This common native warbler inhabits the middle altitudes from approximately 3500 feet in the subtropical belt to perhaps 7000 feet well up in the lower montane belt. Locally it may be found in cool pockets down to at least 2500 feet on the Caribbean slope. The race *comptus*, described by Wetmore (1944, p. 74), is distributed from the Guanacaste Cordillera to the central highlands. *Aurantiacus* inhabits the Dota Mountains in good numbers, and I found it in the subtropical foothill approach to the Talamanca Cordillera on the Caribbean side. It is not yet known from the Talamanca Cordillera proper, the length of which it undoubtedly occurs, other than my meeting it at 5000 feet in the Cañas Gordas district next to Panama. Except for occasional specimens, it matches the Panamanian population in yellowness of under parts; *comptus* is orange-yellow below. The two intergrade over the entire plateau region, including the slopes of the Cordillera Central and the mountains along the southern edge of the plateau, and, to some extent, in the Dota region.

An inhabitant of the cool and wet life zones, the Slate-throated Redstart occurs more commonly along edges, in brushy pastures, or beside openings, cuts, and trails than in forest. The birds station themselves on shrubbery, brushwood, or low branches; where especially abundant, they may rise to high bare branches in tall trees. Their actions, like those of the congeneric *torquatus*, are a mixture of warbler and flycatcher, with the latter predominating. They make insect-catching sallies, flashing prettily as they light unpredictably on any perch at hand. Usually a number of birds blanket a favorable area in two's, three's, or small bands or family groups; a single bird is seen seldom. They are individualistic and show no group behaviour.

The short, poorly musical, chirking song is given through most of the year. At its best it consists of hardly more than a single note repeated in acceleration about six to 10 times to a sudden stop, usually in the middle of a crescendo. When not at its best, it consists of

two short introductory notes followed by a squeaky, "squirky," or "tchrippy" note repeated a few times. Also given are a weakly musical twitter and a variable "tsip."

***Myioborus torquatus* (Baird)**

COLLARED REDSTART

RANGE: Costa Rica and western Panama.

The Collared Redstart is nearly confined to the mountains in the central and southern parts of the country. It is abundant in the montane belt down from timber line, at least in the central highlands, from which it decreases in numbers until it is lacking or rare in the upper subtropical belt; it reaches a low of about 3000 feet in cool pockets. It seems to be uncommon on the Talamanca Cordillera, where probably it is not found below 5000 or 6000 feet. Along the northwestern divide I met it at 5500 feet on the mist-drenched crest of the Cordillera de Tilarán, its northernmost limit; there is no report from the Guanacaste Cordillera. Though largely sympatric with the congeneric *miniatus*, it is centered a couple of thousand feet higher. Thus, it completely replaces *miniatus* upward from about 7000 feet, shares the middle altitudes almost equally, and is rare at lower elevations where *miniatus* is still common.

There is little to choose between the habitat and habits of the two species of *Myioborus*. Both are native to the cool highlands, which are characterized by wet-forested ridges and ravines, ferny ground cover, impenetrable thickety growth alternating with openings, and parklike pastures dotted with epiphyte-laden trees and strewn with fallen mossy trunks and brush. Both occur primarily outside forest; inside forest they may be present, in smaller numbers, mostly at breaks. They forage, as a rule, low in trees and in shrubbery along woodland edges as well as on logs and brush in the open. In woods, however, they may rise well up in the trees. At times they spurt up or cling to mossy trunks as do some wrens, or bend sideways to peer at the under sides of branches as do a number of tanagers. Tirelessly performing side-slipping fan-tailed flits and acrobatic fluttering falls, they resemble the fly-catching American Redstart and the *Myiobius* fly-catchers at lower elevations. Perched, they keep their brightly marked tails spread al-

most habitually while holding their wings so that the tips are below the level of the body. Both are inquisitive, and *torquatus* is often remarkably tame.

The not particularly musical song is patterned differently from that of *miniatus*. Consisting of chirking notes given alternately up and down, it is not unlike that of the yellow-throat *Geothlypis semiflava*, for example, in quality and pattern, but it is shorter, weaker, without slurs, and often cuts off in the middle of a note or ends on an unaccented one. Sometimes it is prolonged, when it terminates in a series of soft "tit" 's on a much higher level. Its "tsit," "stchip," or "stip" is usually sharper than that of *miniatus*, but it is also given very weakly.

***Basileuterus tristriatus* (Tschudi)**

THREE-STRIPED WARBLER

RANGE: Costa Rica to Bolivia and Venezuela.

***Basileuterus tristriatus melanotis* Lawrence**

RANGE: Costa Rica and western Panama.

The Three-striped Warbler, an indicator species of the upper middle altitudes, is known mostly from the central highlands, especially their Caribbean versant, and the Dota Mountains. Though the species is not recorded from the Talamanca Cordillera proper, I met it on the northeastern approach, and it undoubtedly occurs along this cordillera into Panama. I also found it common high on the wet Pacific face of the Cordillera de Tilarán; there is still no report from the Cordillera de Guanacaste. Ranging vertically between 3000 and 7000 feet, it seems to be most abundant upward from about 4500 feet.

It is essentially a woodland species also seen at edges, in contiguous second growth and scrub, and along breaks in the mountainous terrain. Almost without exception it travels about in pure bands low in trees, in thickets, and, especially, through bushy undergrowth. The lively birds flutter and flit and utter their clipping twitters as they sweep through the cover, shaking leaves, balancing on twigs, and going to the ground occasionally; a bird or two may rest a moment close by in plain sight. If in the commotion the observer diverts his attention to

other more attractively plumaged birds that may be accompanying the bands, he does so in the hope of glimpsing some rare species rather than this common one.

Vocally this warbler hardly differs from many neighboring highland birds. It gives freely and in profusion a rushing series of chipping or "tsitting" twitters composed of weakly clipping dry notes sprinkled at times with squeaky and harsh ones. Often the bird makes what seems to be an attempt at song when its twitterings are divided into wave-patterned sets to which a squeakiness has been added. Single notes include characterless "tip" 's or "tsip" 's, a sharp "pst," and a "sreéoo" (one syllable) similar to that of some manakins.

***Basileuterus culicivorus* (Deppe)**

STRIPED-CROWNED WARBLER

RANGE: Mexico to Bolivia and northern Argentina.

***Basileuterus culicivorus culicivorus* (Deppe)**

RANGE: Mexico to Costa Rica.

***Basileuterus culicivorus godmani* Berlepsch**

RANGE: Southwestern Costa Rica and western Panama.

The Striped-crowned Warbler is native to the interior highlands from the upper half of the tropical belt to about 7000 feet in the lower montane belt. Generally fairly common to very common in the subtropical belt the length of the country, it is abundant upward from the 2000-foot level on the Pacific slope along the northwestern divide and the Talamanca Cordillera. Specimens from the Guanacaste Cordillera are hardly distinguishable from the race *culicivorus*, which ranges north into Mexico. Those from the Dota Mountains are also, in my opinion, much closer to the grayish-backed *culicivorus* than to the greenish-backed *godmani*. Others from the central plateau and the Caribbean foothills are variable but average much closer to *godmani* of Chiriquí, while those from the southwest (=Térraba region) all tend toward *godmani*.

The species occurs primarily in humid forest and enters advanced second growth. Though it visits trees in thinned openings, it

does not stray outside the woodland border. It is almost always seen in itinerant groups (also in pairs during the breeding season), either pure or associated with other warblers, antwrens, and tanagers, sweeping low through the trees and the understory. Sometimes it goes to the ground for a moment to rummage in dead leaves. Even when not actively flitting and searching tirelessly for food, the birds nervously flick their wings, jerk their tails, usually held at least partly cocked, and utter their call notes or a fragment of song. Notwithstanding, they often appear to be remarkably fearless as they approach the observer closely.

The song is simple, not very variable, and generally easy to recognize. Given completely, it consists of three "wee" 's on the same level, followed by three consecutively rising "wee" 's, with the last one accentuated. Usually, however, only the last three or so notes are given as an accelerating little crescendo or an unmusical "chip·chip·chírk" lacking the "wee" quality. Again, the sharply rising last syllable gives it special character. Also given are wrenlike and tanager-like "chitting" notes that usually accompany the birds in their lively progress.

***Basileuterus melanogenys* Baird**

BLACK-CHEEKED WARBLER

RANGE: Costa Rica and Panama.

***Basileuterus melanogenys melanogenys* Baird**

RANGE: Costa Rica.

The Black-cheeked Warbler is restricted to the high mountains in the central and southern parts of the country; it is not known from the northwestern cordilleras. Vertically it extends upward and its numbers increase from the upper half of the lower montane belt through the montane belt to above timber line; it is seldom if ever found below 5000 feet. It can be seen regularly though not very frequently only on the volcanic central cordillera and the crest of the Talamanca Range.

Mostly it keeps low in bushy and thickety undergrowth along the borders of and breaks in the mountain forests, in patches of woodland, and in the scrub above timber line rather than inside solid forest. Carriker (1910, p. 797) found it "in small bands of

from six to ten or more." I met it usually in ones, two's, or three's. The bird is very active and, though not shy, often hard to observe in its habitat; it does not keep its tail cocked.

As with many other high-altitude species, it is a very poor vocalist. I have heard only a short and weak, rapid and pebbly "tsitting," a hummingbird-like pebbly titter similar to the last, a broken, very rapid, "tsitting" twitter, and, perhaps as its "song," burred chirrups.

***Basileuterus delatirii* Bonaparte**

DELATRIE'S WARBLER

RANGE: Chiapas to Colombia.

***Basileuterus delatirii delatirii* Bonaparte**

RANGE: Pacific slope of Chiapas to central Costa Rica.

***Basileuterus delatirii mesochrysus* Sclater**

RANGE: Southwestern Costa Rica to Colombia.

DeLattre's Warbler is primarily a resident of the Pacific slope in Costa Rica. Here the distribution of the northern race, *delatirii*, conforms to that of the Central American arid Pacific avifauna. Ranging through the Tropical Dry Forest, it rises to subtropical elevations on the neighboring continental divide and sweeps across the central plateau; it is not known from the apparently suitable Río Frío region. From the central plateau, on which it is common, it extends in decreasing numbers to the lower limits of the subtropical belt at the eastern, Caribbean edge of the central highlands and, rising on the adjacent mountain slopes to somewhat above the subtropical belt, rarely reaches the north side of the Cordillera Central; it is present in unknown abundance in the Dota region. The southwestern race, *mesochrysus*, is apparently confined to the General-Térraba region, where it is common only in parts of the upper tropical and lower subtropical belts. It is unknown in the lowlands or at any elevation farther south.

The habitat varies with physiography and vegetation in different parts of the range. In Guanacaste the bird lives in thickety and scrubby growth as well as in forested stands;

on the central plateau, in almost any patch of woodland; in the highlands above the plateau, within tangled humid growth. It is usually found along woodland edges, in low vegetation in the semi-open, in shaded plantations with thick ground cover, and in way-side shrubbery. Generally the bird keeps from a few inches above the ground in shrubbery and thickets to a few yards up in low trees, seldom higher than the tops of medium-sized ones; sometimes it goes to the ground.

This warbler seems to be rather solitary and sedentary, but many individuals may share a favorable area. Though widespread and common, it is by no means ubiquitous. It will not be met regularly unless one visits its particular haunts. Normally it acts as a typical semiterrestrial warbler in shrubbery and a flitting arboreal one in trees. When the bird relaxes its foraging pace, its somewhat sturdy proportions suggest a vireo. Often it keeps its tail briskly cocked, a mannerism usually noticeable among congeneric species only in the native *culicivorus*, and in *Dendroica pensylvanica* among the migrants.

Its song can be difficult to remember if not heard regularly. Consisting of a number of accelerating "tsit" 's (or "tsüt" 's), it is not unlike that of the redstart *Myioborus miniatuus*. Usually it is introduced by two or three separated staccato notes followed by a series of "tsweeting" jerky ones which often get very complicated. Or it may consist simply of two or three somewhat separated sharp notes succeeded on a lower level by a few faster ones. The bird utters several other unmusical phrases and call notes.

***Phaeothlypis fulvicauda* (Spix)**

BUFF-RUMPED WARBLER

RANGE: Honduras to Peru and western Brazil.

***Phaeothlypis fulvicauda leucopygia*
(Sclater and Salvin)**

RANGE: Honduras to northwestern Panama.

***Phaeothlypis fulvicauda veraguensis* (Sharpe)**

RANGE: Southwestern Costa Rica to central Panama.

The neotropical Buff-rumped Warbler oc-

curs in the humid life zones on both slopes, commonly in the tropical belt, locally and in lessening numbers upward in the subtropical belt. Like the migrant waterthrushes, it may be found at nearly every river, stream, or streamlet, on the boulders or along the banks and shores in wooded country. It also occurs inside woodland, usually along muddy cuts and trails, on the ground or on logs or in shrubbery. Almost without exception it is seen in two's, sometimes in three's. Though recorded in the Tropical Dry Forest "from the Rio Grande de Tárcoles northward, including the whole of Nicoya and Guanacaste [from about 500 to 2,000 feet]" (Carraker, 1910, p. 794), I never saw it there.

Like the waterthrushes, this semiterrestrial warbler continually jets its tail; unlike them, it does not prominently teeter its hindquarters. Rather, its usually spread tail, as though controlled by an independent will of its own, is swept diagonally from side to side instead of lifted and lowered vertically. The bird hops rapidly, spurts in running hops, runs, or, occasionally, walks on rocks and on the ground. It gleans tidbits from mossy stones and also makes fly-catching flutters above rocks and water or over the ground. When the bird progresses afoot along a trash-strewn trail, perhaps it is the sweeping of its tail that stirs up the small, winged insects which the bird flutters to secure. Fearlessly, this little bird may keep just ahead of the observer following the same trail until, sooner or later, it duplicates a mannerism of the waterthrushes by flying a semicircular route back to the site at which it had been disturbed. Its flight is of the evenly fluttering type exemplified, among other species, by the grassquit *Tiaris olivacea*. The Buff-rumped Warbler in the field in no way suggests that it may belong to the genus *Basileuterus* as represented in Costa Rica.

Its vehemently ringing song consists of a single note repeated in accelerating crescendo, like that of the North American Ovenbird (*Seiurus aurocapillus*), for example. It can be introduced by a low "oo-weety-weety," which may itself be developed to resemble the song of the finch *Oryzoborus funereus* or the beginning of the song of *Sporophila torqueola*. An alternate song consists of a simple descending series of sweet notes. The call note is a hard pebbly "tsick" or "djrrt" or a

snapping "tch": doubled, it is similar to that of the grosbeak *Cyanocompsa cyanoides*; given as a pebbly "chitting," that of the tanager *Mitrospingus*.

FAMILY ICTERIDAE

Zarhynchus wagleri (Gray and Mitchell)

WAGLER'S OROPENDOLA

RANGE: Southern Mexico to western Ecuador.

Zarhynchus wagleri wagleri (Gray and Mitchell)

RANGE: Southern Mexico to Panama.

Wagler's Oropendola is widely but unevenly distributed in the humid life zones on both slopes. It is definitely more abundant on the Caribbean side where, though it breeds from the lowlands upward into portions of the lower montane belt, its center of occurrence is in the subtropical belt along the Caribbean versant of the central highlands. It ranges uncommonly westward across the central plateau and northwestward along the Cordillera de Tilarán, where I found it well up in the cool and wet subtropical belt; it is not reported from the Guanacaste Cordillera. In the humid southwest, it is sparse or very local in the lowlands both north and south of the Térraba region, from which it seems to be absent, but very locally not uncommon at upper tropical- and subtropical-belt elevations along the slopes and spurs of the Talamanca Cordillera to Panama. There is no record from the Dota region, where it undoubtedly occurs. It is absent from the Tropical Dry Forest.

This oropendola prefers heavily forested regions in which it nests colonially in openings, breaks, and clearings. It forages in the shaded, tree-scattered semi-open, usually beside forest, as well as inside forest, generally keeping from medium heights to high in the trees in the semi-open and in the canopy in forest. An active agile bird, it searches bare branches like a tanager and makes hopping runs along branches, often flicking the yellow in its tail as a meadowlark (*Sturnella magna*), for example, scissors its white. Its flight, often hurtling and swifter than that of the steady-beating *Gymnostinops*, is more like that of a small bird. Outside the breeding season, the birds occur irregularly in an area, probably as wanderers, in tight

flocks that troop about in a dashing manner.

The bird is often noisy and makes choking, gurgling, and "crashing" sounds. Diagnostic is a rapid throaty hiccup, "ikōōk" or "ōōkōōkūk," sounding, at a distance, like falling drops of water or, as rendered by Austin (1961, p. 287), "bottle-o-glooo." This may or may not be followed by a crashing noise, such as is made by debris falling through dry leaves. Also given are a rather high-pitched short "chok" and a staccato chatter somewhat like that of *Icterus galbula*.

***Gymnostinops montezuma* (Lesson)**

MONTEZUMA OROPENDOLA

RANGE: Southern Mexico to central Panama.

The Montezuma Oropendola, a Caribbean species, is abundant from the lowlands to the lower subtropical belt and occasionally higher, at least on the slopes of the Cordillera Central. It laps onto the humid subtropical Pacific slope of the Guanacaste Cordillera northward from the Arenal gap, but is not known southward along the Cordillera de Tilarán. Though reported from the central plateau (San José), it is a rare straggler at best. It occurs both in heavily forested districts and lightly wooded agricultural areas, often close to habitations.

It nests colonially, always outside forest. In the breeding season it travels in loose groups fairly long distances for food and nesting material, usually in a direct line to and from the colony. Outside the breeding season it occurs in tighter flocks. The bird frequents the semi-open and second growth, enters patches of woodland, and even visits solid forest, where it is sometimes found foraging singly. It occurs at all heights in the trees and lower arborescent growth. Its foraging behavior is varied. Thus, the bird climbs limbs with an exaggerated side-to-side turning of its hindquarters, moves sideways along a branch like a parrot, hops along a limb and leaps from branch to branch like a toucan, leans over to search bark, foliage, and epiphytes as do certain tanagers, pokes its head under fronds to look for prey, probes flowers, perforates fruits, and sometimes even engages in fly-catching. Its flight is crowlike, with or without a wavy accent on the upbeat, and the male produces at will a heavy whirring sound with his wings.

The "song," really a call, of this noisy species is best described by Richmond (1893, p. 494): "The song is a gurgling sound, rapidly ascending the scale, and simultaneously with it another sound is uttered resembling the shrill squeaking of a hinge or wagon wheel in need of attention. The attitude of the bird in the act of singing is also remarkable. When about to deliver its notes it makes a profound bow, bringing the head below the level of its perch, at the same time raising the tail to a vertical position. While singing the bird gradually resumes its normal position. It sings at frequent intervals for a half hour or more, and when not thus engaged sits dressing its feathers or hops leisurely about." Crandall added (1914, p. 341): "The notes and display of the male *Gymnostinops* have been described too often to be repeated here. It was noted, however, that the male often flew against a nest with great force, so that it swung about wildly, and that the curious gymnastic performances were executed while the bird hung sideways in this perilous position." The display, which Fuertes has illustrated (1914a, p. 97), is weakly approximated by the Brown-headed Cowbird (*Molothrus ater*) of North America. Also given are a gargling, mouth-rinsing "kwukawuk," and so on, a garrulous "awk," "unk," and "crunk," wheezing asthmatic sounds, a single or double squawk, and a crashing noise. This crashing or crackling, like the tearing of dry banana fronds, is produced vocally, not mechanically.

***Cacicus uropygialis* (Lafresnaye)**

SCARLET-RUMPED CACIQUE

RANGE: Extreme southeastern Honduras to Peru.

Cacicus uropygialis microrhynchus

(Sclater and Salvin)

RANGE: Extreme southeastern Honduras to Panama.

The Scarlet-rumped Cacique is found primarily at lower tropical-belt elevations in the humid life zones on both sides of the country, much more commonly and widespread on the Caribbean than the Pacific. There is no record from the entire northwestern quadrant, neither the Tropical Dry Forest, the northwestern divide, or the northwestern

Caribbean slope, nor any portion of the central plateau region. Though it ranges upward to at least 3000 feet, the bird turns shy at the higher elevations, where it often escapes detection in the high canopy to which it keeps as though confined.

On the Caribbean side the species occurs in the semi-open and in second growth usually in the immediate vicinity of forest as frequently as in the forest, which it visits daily. In fact, it seems to be largely restricted to heavily wooded areas. In the forest it frequents the middle and upper strata; in the semi-open it may descend to the level of banana plants, sometimes fearlessly close to the observer. On the Pacific side, i.e., the southwest, it is rarely found above the forested lowlands, in portions of which it may be extraordinarily abundant and, in places, occurs in large numbers in tall mangroves.

This gregarious bird is almost always seen in small bands the rousing passage of which flushes into view other kinds of birds foraging inside the foliage. Where abundant it is noisy, active, and bold. Its behavior is highly varied as the bird satisfies its taste for many sorts of animal and plant food. Thus, I have seen it descend a vine to snatch a large spider from its web, go to the ground at a wet spot in the forest, and, clinging to the under side of a thick bare limb, examine a crevice in the manner of a woodhewer or a woodpecker. Returning in straggling groups from the woods at dusk, the birds roost as a flock in trees close to the forest border.

The bird makes a number of arresting calls, resembling in this respect one of its neighbors, the cotinga *Lipaugus unirufus*. Neither species is shy about announcing itself, and both are responsible for some of the characteristic woodland sounds, at least in noisiness and lack of constraint. The cacique may repeat several times a many-syllabled cry, something like a traffic whistle, accompanied by a spreading of the wings, a harsh "cheeoor cheeoor," and other notes, expressed, as it were, with difficulty through the nose, suggestive of those of *Cassidix mexicanus*.

***Amblycercus holosericeus* (Deppe)**

PRÉVOST'S CACIQUE

RANGE: Mexico to Bolivia and Venezuela.

***Amblycercus holosericeus holosericeus* (Deppe)**

RANGE: Mexico to northern Colombia.

The countrywide Prévost's Cacique has a vertical distribution that extends, as in few other birds, from sea level to timber line. Though uncommon above the plateau region, it is not a straggler, as I took a bird in breeding condition at 9500 feet on the Talamanca Cordillera. It is most abundant, however, in the humid tropical belt and in portions of the lower subtropical belt. It is scarce in the Tropical Dry Forest, perhaps absent northward from the head of the Gulf of Nicoya, and I met it in only two localities, both at Lake Arenal, along the northwestern divide.

The species is strictly an inhabitant of thickets and tangled new growth as well as roadside hedges and overgrown boundaries, both in heavily forested country and in agricultural regions; it does not enter forest. High on the Talamanca Cordillera I found it in the impenetrable canelike bamboo so characteristic of thinned woodland at that altitude. It is met singly, in small parties or family-sized groups, but more often than not in two's. A sedentary bird that rarely exposes itself, it flies little, making at most a fluttering dash across a trail from one mass of vegetation to the safety of another. Undoubtedly aware of the observer's antics as he peers into the dense growth, the bird often proceeds noisily with its scratching, tearing, and rummaging among the hanging dead leaves and dry stems. Sometimes it furrow-peels bark on a slender limb, using its beak as a plow. In general, I associate the bird more with the angular buffs and browns of reedy thickets than the rounded green of fresh shrubbery. Notwithstanding, the above habitat and habit restrictions lose force where the bird is especially abundant.

This cacique is heard far more often than seen. Its liquid whistles, long churrs, and barks issuing from thickets usually cease at the observer's approach, yet the bird responds readily to squeaking. Apparently, as with many wrens, the members of a pair each contribute to the songs or calls.

***Scaphidura oryzivora* (Gmelin)**

GIANT COWBIRD

RANGE: Southern Mexico to Bolivia and northeastern Argentina.

Scaphidura oryzivora impacifica Peters

RANGE: Southern Mexico to western Panama.

The uncommon Giant Cowbird is primarily an inhabitant of the Caribbean slope. Distributed most of the length of the tropical belt, though not recorded from the northwestern sector, including the continental divide, it rises through the subtropical belt, so far as known, only on the central highlands. In diminishing numbers it spreads to the central plateau at least as far as San José and up the neighboring slopes. I also found it south of Tapantí on the northeastern approach to the Talamanca Cordillera. As this cowbird lays its eggs in the nests of both species of oropendola, its distribution and frequency seem to coincide with those of the nesting colonies rather than climatic or ecological conditions. Nevertheless the bird remains unrecorded from almost the entire Pacific slope. Possibly it occurs in the southwest where another host, *Cacicus uropygialis*, is present. On the Caribbean side, at any rate, I have seen the yellow-billed, white-eyed immature of this cowbird escorted by a group of the smaller *Cacicus*, which were feeding it in response to its gestures and cries, the latter a musical sort of bark ("aow" or "aowp").

The bird is usually seen sitting alone high on a tree beside a colony of oropendolas or spied flying across the semi-open. When, rarely, a small and, so to speak, sinister group is seen perched, the deep-chested, thin-necked, black birds appear to have disproportionately small, flat heads. In Costa Rica I have seldom seen this species near cattle but rather, alone or in small groups, on the ground or on a fallen trunk, strutting on its relatively long legs and with uptilted tail in a crowlike manner. Its flight is distinctive, in Costa Rica, for a long-tailed black bird. The bird flies rapidly, follows a direct course, and features wing-folded dips separated by quick series of beats, often (not always) accompanied by a whirring of the wings and a vocal "crunk," "quink," "zip," "crik," "ek," or "uk." In addition, it utters a chucking rattle and an unpleasant, constricted piercing and rising "wweee."

Tangavius aeneus (Wagler)

BRONZED COWBIRD

RANGE: Southwestern United States to western Panama.

Tangavius aeneus aeneus (Wagler)

RANGE: Southern Texas to western Panama.

The Bronzed, or Red-eyed, Cowbird occurs mostly on the deforested central plateau, where large noisy flocks fly about and roost in the parks of San José. In lessening numbers it ranges up the neighboring volcanic slopes to the lower montane belt, southward into the Dota region, and eastward and downward to the lower limit of the subtropical belt along the Caribbean side of the Cordillera Central. Occasionally it has been found on the northern slopes of Poás and Barba volcanoes, to which it probably wandered from the central plateau. It occurs sparingly at agricultural inroads into the Caribbean lowlands, from the Sixaola region to the Old Line Railroad. In the Río Frío region, however, it is abundant. Apparently it is scarce in the Pacific northwest, despite Carriker's (1910, p. 832) statement to the contrary; it has been reported from only two localities, both in the Tempisque basin. As yet it is unknown from the northwestern divide and all of the southwest.

This is an open-country species which scouts about individually (or perhaps in small groups) for nests that it can parasitize during the breeding season and which flocks during the rest of the year. I concur fully with Cherrie [1892 (1891-1892), vol. 9, p. 25] that a favorite host is the finch *Atlapetes gutturalis*, at least in the central highlands. It is largely a terrestrial forager and is often found with the ani *Crotophaga sulcirostris* attending cattle, even mounting their backs to seek succulent vermin. In the breeding season I have seen two opposing males puffing and swelling on the ground, rising rhythmically on their toes, and hovering one above the other. The bird makes very thin and high-pitched, unpleasant-sounding, squeezed-out whistles, something like the squealing of brakes, at different levels. Distinct and separate when given by a single bird, they become very involved when issuing from a flock. A single note is a constricted, thin and sibilant "tsweenss."

Cassidix mexicanus (Gmelin)

GREAT-TAILED GRACKLE

RANGE: Southwestern United States to Peru and northwestern Venezuela.

***Cassidix mexicanus peruvianus* (Swainson)**

RANGE: Costa Rica and probably adjacent Nicaragua to Peru and northwestern Venezuela.

The Great-tailed Grackle has its Costa Rican headquarters in the lowlands of the northwestern quadrant of the country. It is distributed continuously but not commonly, except in the town of Puntarenas, along the shores and at the head of the Gulf of Nicoya, coincidentally with the distribution of mangroves. It is partial to the vicinity of water, too, along the Río Tempisque and the edges of the tide-flooded lowlands and low-lying lagoon country. Here, outside the towns, it is usually met singly. Elsewhere in the Tropical Dry Forest it is concentrated in good numbers in the interior, as at Liberia, where it was not reported by Wetmore (1944), but has since become abundant in the palms in the center of town and even walks along the streets. It is undoubtedly increasing in numbers throughout the Pacific northwest.

In more "natural" habitat, I found the species abundant in the open Río Frío region. This population may be connected with Guanacaste birds along the shore of Lake Nicaragua. The species is known also far to the southwest, in the Térraba delta and close by at Palmar, and I met it uncommonly in the mangroves at the head of the Golfo Dulce. Apart from the Río Frío region, it is found on the Caribbean side, in good numbers and again in palms, at Puerto Limón, where I have seen it repeatedly in recent years. Possibly these birds represent an extension of an unrecorded population north of the city. The species should now almost certainly be present at the mouth of the Río San Juan.

This grackle is an aggressive, noisy bird with a swaggering gait. Where abundant, individuals keep chasing about, are very bold, and are attracted to cattle on which they pick the parasites from their hides. Away from towns or the neighborhood of man, it seems to subsist mainly on aquatic creatures along the margins of lagoons and estuaries. It has a large variety of guttural, creaking, rattling, chucking, and whistling calls, the last sounding forced through a cold in the head and unpleasant to hear.

Cassidix nicaraguensis* (Salvin and Godman)*NICARAGUAN GRACKLE**

RANGE: Shores of lakes Managua and Nicaragua (including adjacent Costa Rica).

Richmond (1893, p. 496) reported this grackle from San Carlos at the southeastern corner of Lake Nicaragua, and recently (1962) Thomas R. Howell told me he had found it at the Río Frío on the Nicaraguan side of the international boundary. At Los Chiles in the Río Frío region, two miles south of Nicaragua, in early April, 1962, I saw small grackles of this species, generally in scrubby growth, at the fringe of the multitudes of the much larger *mexicanus*.]

Icterus spurius* (Linnaeus)*ORCHARD ORIOLE**

RANGE: Breeds in eastern United States; winters from southern Mexico to Colombia and western Venezuela.

The Orchard Oriole is apt to occur anywhere from the lowlands of either coast to the altitude of the central plateau and possibly somewhat higher. One of the first of the fall migrants, it begins to arrive before the end of July and departs by about the middle of April, though recorded to the end of the month. It is quite common during both periods of migration. In winter its numbers are much smaller, but it can be seen from time to time. Both as a transient and visitant it is common in the Pacific lowlands, uncommon elsewhere, and is generally absent from extensively forested regions. Its habitat lies in the semi-open, especially where the trees are low and bushy and mixed with matted shrubbery.

Like the migrant *galbula* but unlike the resident species of its genus, it has differently colored sexes, travels about in bands, and is distributed over much of the country. Unlike *galbula* it sweeps as a rule through bushes, shrubbery, and new low growth, whereas *galbula* passes openly through trees. For this reason, and perhaps because it is more wary, this active oriole is generally not easy to observe. The male may sing after a fashion shortly upon arrival in the fall; in the spring I have heard it give snatches of song in the latter part of March. The "song"

is an "ocking" chatter intermixed with rapidly whistled, consecutive "weer" 's of the throat-constricted type made by *Cassidix* and *Cacicus*. The usual cries include a heavy "chek" or "chuk-chuk," a guttural "krirk" like the cry of a Dickcissel, and a short wren-like chatter.

***Icterus prosthelas* (Strickland)**

BLACK-COWLED ORIOLE

RANGE: Southern Mexico to northwestern Panama; Bahamas.

***Icterus prosthelas prosthelas* (Strickland)**

RANGE: Southern Mexico to northwestern Panama.

The Black-cowled Oriole is a Caribbean species generally common the length of the tropical belt. It rises in diminishing numbers to the lower subtropical belt, sparingly to the middle portion of the belt along the central highlands. Along the northwestern divide I found it only at the Arenal gap (altitude approximately 2000 feet) between the Guanacaste and Tilarán cordilleras. Because its appearances above the tropical belt are irregular and transitory, the bird probably wanders up the larger valleys.

Notwithstanding the smaller neotropical range of this species, it has a broader ecological tolerance and distribution in Costa Rica than its congeneric neighbor, *mesomelas*. Though widely dispersed, it is nowhere abundant. A nonforest species, it occurs in tree-scattered plantations, overgrown clearings, cutover forest, along forest borders, usually in wooded areas. For the most part it keeps from medium heights in the smaller trees down to shrub height in tangled vegetation, clumps of banana palms, and scattered groves. It is seen in two's or three's, seldom alone. Immature birds, however, are generally seen in small groups with or without accompanying adults. The birds move about actively in the foliage of the arborescent vegetation and give the impression that they are roaming about.

The usual note is a metallic bell-like "woink" accompanied by a twitch of the tail. The variable, deliberate song of somewhat separated notes has the quality of that of an oriole or finch. My several transcriptions are

meaningless on paper, although they mostly show a definitive final note. The bird also makes several monosyllabic cries.

***Icterus mesomelas* (Wagler)**

YELLOW-TAILED ORIOLE

RANGE: Southern Mexico to Peru and northwestern Venezuela.

***Icterus mesomelas salvinii* Cassin**

RANGE: Nicaragua to Panama.

The Yellow-tailed Oriole is a Caribbean species largely confined to the lowlands, from which it barely rises into the tropical-belt foothills and rarely exceeds the upper limits of the belt. It is completely sympatric with the congeneric *prosthelas*, but the latter rises considerably higher and is known to reach the northwestern divide.

It is much larger sized and rounder winged than *prosthelas*. Moreover it is relatively sedentary, flies about less, and is not so active. If not actually shier than *prosthelas*, it is less easily seen openly in the habitats it usually frequents. It avoids forest and is seldom found close to the forest border. It prefers riverside thickety growth, canebrakes, clumps of banana plants, and other tangled vegetation near water. It strays slightly to trees in nearby clearings and plantations. Generally it is met alone or in two's.

Because it is a very good singer, this oriole is one of the most highly esteemed cage birds. Typically it keeps repeating a spirited, wren-like, richly whistled, usually three-note phrase, of which the first two notes are on the same level and the third consistently higher or lower in a particular series; sometimes it is throaty with slurs. It also gives a "spinking" "chirk chirk chirk cho," and so on, mixed with mellow whistles, and a somewhat similar "chee chuck wah hoo."

***Icterus pectoralis* (Wagler)**

SPOTTED-BREASTED ORIOLE

RANGE: Southern Mexico to Costa Rica.

***Icterus pectoralis espinachi* Ridgway**

RANGE: Costa Rica.

This Central American oriole, a member of the arid Pacific avifauna, reaches its southernmost limit in northwestern Pacific Costa Rica.

Here, represented by the form *espinachi*, it is nearly restricted to the Tropical Dry Forest. It has been recorded principally from the Tempisque basin northward to Liberia and up the lower slopes to the strip of Subtropical Moist Forest along the Guanacaste Cordillera (Miravalles and Tenorio). Also, I found it in the Barranca-Puntarenas district on the mainland side of the Gulf of Nicoya.

Primarily an open-country oriole, the Spotted-breasted frequents scrubby woodland and small stands of low trees in the Guanacaste lagoon country and the ranch lands covering so much of the province. It is seen singly or in two's, usually fairly low, from below shrub height to medium heights in the trees, and is met irregularly. Its rich song is reminiscent of that of *mesomelas* of the Caribbean slope.

***Icterus galbula* (Linnaeus)**

BALTIMORE ORIOLE

RANGE: Breeds in eastern North America; winters from southern Mexico to Colombia and northwestern Venezuela.

The Baltimore Oriole begins to arrive early in September but is not common until later in the month and in October. Though still met into May, it largely departs the country by the third week of April after having already become uncommon in the latter part of March. In the winter it is abundant over most of the country, from both coasts well into the subtropical belt, including the central plateau, and occurs in lesser numbers through most of the lower montane belt. In much of the southwest, except locally, it seems to be relatively uncommon above 3000 feet or so, probably because obstructed by solid forest above that elevation. The broad pattern of distribution, much wider than that of all the native orioles (*Icterus*) combined, duplicates that of the Blue Tanager, for example. The migrant Baltimore, which is apparently better adapted to differing environments, also greatly exceeds the resident species of *Icterus* in numbers. Possibly a better understanding of its success can be obtained from its freely wide-ranging behavior here on the wintering grounds than from the activities of a territory-tied breeding pair in the north.

Frequenting the boundaries of cultivated

lands, tree-dotted fields and pastures, plantations, edges of woodland, savannas, and coastal marshes, the bird occupies areas left clear by nature or altered by man. Occasionally it enters somewhat upon the forest roof. Also seen singly, it generally occurs in lively bands of a few to a dozen or more individuals that roam about yet may become attached, at least temporarily, to a particular place. Grouped birds seldom go below the crowns of smaller trees and may forage high in tall ones, but I have seen a few clustered on grasses 8 feet tall. Of varied behavior and diet, the peering bird may busily examine the sides of bare branches, as do tanagers, and I have seen one pluck a dead leaf, place it under foot, and pick at it for some item of prey. Individuals may arrive one by one in a tree receiving the last rays of the afternoon sun to sit silent, glowing with a hue different from that in broad daylight, until the sun sinks, when they fly off to roost after most other birds have already retired.

This species uses its voice rather freely and is one of the few migrants that sing in the winter. Its song, simpler than that on the breeding grounds, consists of several similar, rich and mellow whistles: "choo choo choo-choo-choo." Should it descend somewhat, it resembles the call of the becard *Pachyrhamphus polychopterus*. The birds also make peculiar metallic notes like the rusted "pulley" ones of many jays, a wrenlike chatter similar to that of *spurius*, and a dry guttural rattle.

***Icterus bullockii* (Swainson)**

BULLOCK'S ORIOLE

RANGE: Breeds from western North America to central Mexico; winters from Sinaloa southward in Central America west of the continental divide; recorded in northwestern Costa Rica.

***Icterus bullockii bullockii* (Swainson)**

RANGE: Almost the same as that of the species.

The only Costa Rican record, the southernmost for the species, is that of Wetmore (1944, p. 76): "A female taken at Liberia [Guanacaste] on November 1, 1940, has the abdomen more yellowish than the average of *bullockii* but otherwise exhibits the coloration of that bird, except that two scapular

feathers on the left side have the outer webs dark at the centers as is regularly the case in *Icterus galbula*."

***Icterus pustulatus* (Wagler)**

STREAKED-BACKED ORIOLE

RANGE: Mexico to Costa Rica.

***Icterus pustulatus sclateri* Cassin**

RANGE: Southern Guatemala to Costa Rica.

The Streaked-backed Oriole in Costa Rica is completely sympatric with *pectoralis*. Both species are confined to the Pacific northwest, but *pustulatus* does not seem to extend south of the Tempisque basin. Otherwise the remarks made for *pectoralis* could apply equally to this species. My casual observations were not sufficient to enable me to distinguish between the two in habits and ecology, except that *pustulatus* seems to be a very poor vocalist whereas *pectoralis* is a very good one. To my knowledge, *pustulatus* does not sing but gives individual oriole-like musical chirps. It also makes a wrenlike or *galbula*-like rattle and a rapid dry chatter like that of the meadowlark (*Sturnella magna*). I did notice this oriole often fluttering for small fruits, but this may have no special significance.

***Agelaius phoeniceus* (Linnaeus)**

RED-WINGED BLACKBIRD

RANGE: Canada to northern Costa Rica; Bahamas and Cuba.

[*Agelaius phoeniceus brevirostris* Monroe]

RANGE: Caribbean slope of Honduras and southeastern Nicaragua (including adjacent north-central Costa Rica).]

***Agelaius phoeniceus costaricensis* van Rossem**

RANGE: Northwestern Costa Rica (Guanacaste Province).

Red-winged Blackbirds in Costa Rica frequent marshy habitats amid generally open surroundings as well as mixed thickety growth and low trees on neighboring dry land. They resemble, act, and sound like the birds in the United States.

The species occurs abundantly in localized concentration in the Río Frío region, just southeast of Lake Nicaragua. This popula-

tion belongs almost unquestionably to the recently described *brevirostris* (Monroe, 1963). In early April I found the birds, usually in large flocks, terrestrially on hard, soft, or grassy ground and also rather low in the trees. Many were singing individually, though tightly grouped, and single males afoot, say, in a marsh were displaying their red shoulder patches prominently.

The race *costaricensis* seems to be restricted to the Guanacaste lagoon country at the head of the Gulf of Nicoya and in the lower Tempisque basin. I happened to see it, not in flocks but only as a few loosely associated individuals, uncommonly and locally.

***Sturnella magna* (Linnaeus)**

COMMON MEADOWLARK

RANGE: Eastern North America to Colombia and Brazil; Cuba.

***Sturnella magna alticola* Nelson**

RANGE: Southern Mexico to Costa Rica.

The species is confined to grassy fields and pastures in northern and central Costa Rica from the lowlands to somewhat above timber line, but it is rare to uncommon in the montane belt. It is at present and seems originally to have been primarily an inhabitant of the cool middle altitudes in the central highlands. It is abundant over the entire plateau region, including the Reventazón watershed, and in parts of the Pacific northwest, particularly the cleared lower slopes of the Guanacaste Cordillera, and it is present at the head of the Gulf of Nicoya. Probably it occurs the length of the intervening Cordillera de Tilarán, as I found it common at Monteverde. Previously unknown in the Caribbean lowlands, it is now not uncommon in cleared areas in the northeastern sector. However, neither Richmond (1893) nor I found it in the apparently suitable Río Frío region. It is unknown from all of the southern half of the country, where I cannot, without postulating habitat barriers, explain its absence from the southwestern savannas and the Térraba region generally.

This ground-dwelling bird appears shoulderless and wingless, with an underslung body, narrow at the chest, broad and thick at the belly. Postured semi-erect, its head and beak extend horizontally in front and its

short tail behind, like a low step. Its sturdy legs appear placed near the end of the body and set rather widely apart, separated by a greater space at their insertion than at toe level; though actually long, they give the illusion of shortness. Its walk is a stiff-legged waddling strut. The course of the bird is jerkily erratic, like that of a wound-up toy, and its flat head (no forehead separates the beak from the crown) moves back and forth in time with the speed of the legs. Sometimes the bird draws itself stiffly to a vertical pose in order to look about, and it may even leap straight up a few inches, insanely, probably to do some fly-catching. Crouched, hugging the ground as do many other terrestrial birds suspecting danger, it may disappear from sight in short grass. The bird often scissor-flicks its tail, both when standing still and walking, alternately to flash and conceal the white. Flying on a level plane with short-arc'd fluttering wing beats followed by even-keeled long glides, its stout body, short tail, and short wings, held slightly bowed, suggest a quail. It may hover before alighting, then falls as though dropped.

Regularly it rests and prefers to sing and chatter on elevated perches, such as branches, posts, stumps, or knolls, often struggling to keep its balance on the very tip of a slender twig atop a small tree. Its short song, indistinguishable to my ears from that of the birds in the eastern United States, usually consists of paired two-part sweet whistles, slurred and drawn out, the first usually rising, the second falling; there are many variations. Its highland neighbor, the sparrow *Zonotrichia capensis*, has a very similar song, but it is not two-parted and often terminates in a rattling trill. The meadowlark also makes a rasping buzzy twitter introduced by a deep piglike note as well as a froglike or tityralike "ek."

[*Dolichonyx oryzivorus* (Linnaeus)]

BOBOLINK

RANGE: Breeds in North America; winters in south-central South America; migrates chiefly across Caribbean Sea, casually along mainland Middle America; recorded in Galapagos Islands.

The Bobolink was listed by Carriker (1910, p. 825), because "a specimen is recorded by

Sclater and Salvin as having been taken in Costa Rica by Zeledón." Sclater and Salvin (1879, p. 509) did list the species, but they were writing on "Birds from Antioquia" and the locality was Medellín [Colombia]; there are no other data nor any mention of Zeledón. The species was again given for Costa Rica by Salvin and Godman (1879-1904, p. 448) on the basis of its inclusion by Zeledón (1882, p. 10). Zeledón, however, merely listed the bird without any comment whatsoever. The species appeared again on page 112 of Zeledón's 1887 list, this time with the locality: "Norte América." It would not be at all unreasonable to expect an occasional individual, especially along the Caribbean slope, but there is no evidence that the species has ever been seen or taken in Costa Rica.]

FAMILY THRAUPIDAE

Chlorophonia occipitalis (Du Bus)

BLUE-CROWNED CHLOROPHONIA

RANGE: Southern Mexico to western Panama.

Chlorophonia occipitalis callophrys (Cabanis)

RANGE: Costa Rica and western Panama.

The chlorophonia inhabits the mountains principally in the central part of the country. There it is common throughout the highlands, mostly above the central plateau to timber line. On the Caribbean versant an occasional bird may, after the breeding season, descend a cloud-forested pocket to the upper limits of the tropical belt; it has not been found so low on the Pacific side. There is only one report from the Talamanca Cordillera proper, along which, though I never happened to find it, the species is undoubtedly distributed sparsely to Panama. In addition, I found it abundant on the wet subtropical Pacific slope of the Cordillera de Tilarán; it is not reported from the Guana-caste Cordillera.

The species is usually seen along woodland edges and in tree-studded openings rather than well inside solid forest. The birds travel about in bands that consist largely of female and immature-plumaged individuals and a few adult males, at other times in two's or three's. Apparently following set rounds, they forage high or low in the trees, even in

isolated shrubby ones, say, in a pasture. Trooping freely as a pure group or at times with other species, they cross openings directly from one site to another in rapid dipping flight. Linger in a well-provisioned tree, they hop along branches and scan their under sides, flutter amid foliage, or hover at fruiting clusters. In the style of many tanagers, the chlorophonia slowly squeezes a plucked berry with its bill so that the juice runs down into its throat, then drops the deflated sac. Standing stiff-legged like the much smaller euphonias, it contorts its body comically when voiding sticky waste.

The usual note is a musically mournful, short "oo," often doubled, sometimes repeated a few times, that is possibly its song; it can also sound like "ahr," "oor," or a mouth-puckered "ü." Sometimes this melancholy tone sounds ventriloquially close, as if a small dove were under foot; at other times it resembles a tunefully swinging iron gate. Doubled, it bears a dulled resemblance to notes of some of the euphonias. When two birds call at the same time, their respective notes, differing in key and tempo, coincide or alternate so that one sounds like the distorted echo of the other. Also given are a short "ek," "uk," or "wek" and a sharp "wirt." The "ek" identifies the bird as certainly as the "oo."

Tanagra elegantissima (Bonaparte)

BLUE-HOODED EUPHONIA

RANGE: Southern Mexico to western Panama.

Tanagra elegantissima vincens (Hartert)

RANGE: Extreme southern Mexico to western Panama.

The Blue-hooded Euphonia inhabits the interior highlands from the central part of the country to Panama; it is not known from the northwestern cordilleras. Previous records pertain to the central highlands, including the Dota Mountains, mostly in the subtropical and lower portion of the lower montane belts. In addition, I found it in pairs several times during January in the upper tropical belt at Buenos Aires, again in March well up in the subtropical belt in the Cañas Gordas district, on the approaches to the Talamanca Cordillera in the far southwest. In

Costa Rica it is the only open-country euphonia centered above the tropical belt.

This euphonia evidently prefers the partially deforested parts of its range. Apparently it wanders about after the breeding season, flying in goldfinch-like dips and foraging largely for mistletoe berries as it travels. Though the species is well represented by museum specimens and cage birds are on sale in San José, I met the wild bird in very few places. It utters a raspy high-pitched gabble at crackling speed, a "tsoor" similar to the note of the chlorophonia, and a "tsyip" either singly or alternating with a "tsyeer" or the "tsoor."

Tanagra anneae (Cassin)

TAWNY-CAPPED EUPHONIA

RANGE: Costa Rica to extreme northwestern Colombia.

Tanagra anneae anneae (Cassin)

RANGE: Costa Rica and western Panama.

The Tawny-capped Euphonia is confined to the Caribbean slope, primarily in the cool and wet subtropical belt, mostly, so far as known, on the slopes and foothills of the Cordillera Central and in the Reventazón watershed. It reaches the eastern slope of the Guanacaste Cordillera in the northwest, and I met it at the Arenal gap in the divide. Elsewhere I found it in the tropical belt at the Río Sixaola in the extreme southeast, hence assume it is distributed continuously along the Talamanca Cordillera, and also in the Sarapiquí region of the northeastern lowlands, where it is an uncommon to rare postbreeding wanderer that descends the foothills to their junction with the coastal plain.

The species occurs in heavy woodland, along the forest border, and at breaks in forest, as a rule fairly low in the trees. It is seen singly, in pairs, and in small groups, either by itself or with traveling mixed bands. This is not a sweet-voiced euphonia. It makes a usually doubled, antbird-like nasal "enk" or "ank" and a catlike "myă," whining nasal notes, a short sharp "squip," various unclear scratchy notes, a formless twittering chatter, a little trill, and other cries. It also utters a set of two or three hoarse, unclear sounds faintly recognizable as belonging perhaps to a euphonia.

[*Tanagra fulvicrissa* (Sclater)

FULVOUS-VENTED EUPHONIA

RANGE: Panama to western Ecuador.

***Tanagra fulvicrissa fulvicrissa* (Sclater)**

RANGE: Panama and extreme northwestern Colombia.

The presence of this euphonia in Costa Rica seems to be based entirely on specimens in the collection of the Smithsonian Institution, reported by Cassin (1865, p. 171). Ridgway, who presumably saw them, cited Cassin's Costa Rican localities (Angostura and Pacuare), both in the Reventazón Valley, in the synonymy for *fulvicrissa*, yet did not include Costa Rica in the range of the species [1902 (1901-1950), pt. 2, p. 19]. Carriker (1910, p. 871) did not include the species, but placed the above reference in synonymy with *Euphonia gracilis* (= *Tanagra imitans*), also without explanation. This seems odd because *imitans* does not occur on the Caribbean slope, as Carriker (*loc. cit.*) was well aware. (I have, incidentally, seen specimens of *imitans* misidentified as *fulvicrissa*.)

With regard to the specimens in the Smithsonian Institution, I have been advised by G. E. Watson (personal letter, June 26, 1963) that only one can be found and that it has been reidentified as *Tanagra gouldi praetermissa* by A. Wetmore. Furthermore, Eugene Eisenmann informs me that *fulvicrissa* seems not to have been found west of central Panama on the Caribbean side, while there are at least two records from Chiriquí Province on the Pacific side. It would appear that the Caribbean *gouldi* and the Pacific *imitans*, both of which terminate their ranges in western Panama, are replaced eastward by the closely related *fulvicrissa*, which must be struck from the Costa Rican list.]

***Tanagra minuta* (Cabanis)**

WHITE-VENTED EUPHONIA

RANGE: Guatemala to Bolivia and Brazil.

***Tanagra minuta humilis* (Cabanis)**

RANGE: Guatemala to western Ecuador.

The little White-vented Euphonia is distributed almost exclusively in the humid life zones on both slopes. It is most abundant on the Caribbean side, from the lowlands

into the lower subtropical-belt foothills that front the eastern end of the plateau region, and is to be met the year round. It has also been reported, doubtless as a postbreeding wanderer, from the central plateau to the lower montane belt on the neighboring slopes. As yet there is no record from all the northwestern divide and its Caribbean approach. On the Pacific side it is absent from the Tropical Dry Forest and relatively uncommon in the environmentally suitable southwest, where it is known primarily from the tropical belt, the upper limits of which it barely exceeds.

Essentially a nonforest species, it enters forest slightly at canopy height but occurs mostly in the semi-open beside woodland. It travels about the countryside in groups of three or four to perhaps a dozen individuals from fairly low in small trees to, usually, well up in tall trees in shaded plantations, tree-dotted clearings and pastures, second growth with emergent trees, and thinned woodland borders. The species has the pronounced habit of sidling along branches and exaggeratedly shifting or stretching its tail from side to side. The latter trait I have also noticed only in *affinis*.

Rarely have I heard this bird utter the two-note or three-note musical call given by the similarly colored and patterned *luteicapilla* and *affinis*. Rather, it bears a vocal resemblance to *gouldi* and *imitans*. Its large but poorly musical repertoire is characterized by "tsk"'s, kissing sounds, and a measured variable "swít·sit." It also makes warbler-like "sweet"'s alone or in rapid succession, a guttural churring typical of euphonias generally, a hoarse warble, and other sounds.

***Tanagra affinis* Lesson**

SCRUB EUPHONIA

RANGE: Mexico to Costa Rica.

***Tanagra affinis affinis* Lesson**

RANGE: Eastern Mexico to Costa Rica.

The Scrub Euphonia, a member of the Central American arid Pacific avifauna, is at its southern limit in northwestern Costa Rica. Here it is distributed throughout the Tropical Dry Forest and along the deforested lower slopes of the Guanacaste Cordillera. In very small numbers it extends eastward onto

the Pacific portion of the central plateau, probably as a seasonal or irregular visitant. A report from Cariblanco on the wet Caribbean slope is very unusual, perhaps erroneous.

The species is usually seen in two's or three's. It is common in pastures, ranch and agricultural lands with semi-isolated low trees or small stands of trees, seldom high above the ground. It also frequents taller, moister woods of the sort at which to expect *luteicapilla*, and here it rises high in the trees. Besides feeding largely on mistletoe berries, the bird scans the under sides of bare branches. It exhibits the side-to-side shifting of the tail noted in *minuta*.

Though closely similar superficially to the allopatric *minuta*, it is very different vocally. Its call usually consists of three thinly musical notes on the same level that are whistled, so to speak, through its teeth, less often of two notes given more slowly. A single whistle is also given. Other cries are a doubled guttural scratchy note and a "wheet chichi-chichih" like that of the greenlet *Hylophilus decurtatus*.

***Tanagra luteicapilla* (Cabanis)**

YELLOW-CROWNED EUPHONIA

RANGE: Nicaragua to Panama.

The Yellow-crowned is the most abundant and widespread of the nonforest-inhabiting euphonias. Occurring throughout the humid tropical belt on both slopes, it rises here and there into the lower subtropical belt and spills through gaps from the Caribbean side onto humid portions of the Guanacaste Cordillera northward from the Arenal gap. It is absent from the Tropical Dry Forest north of the entrance to the Gulf of Nicoya and rare or seasonally sparse on the central plateau and its adjacent slopes. Completely sympatric with the congeneric *minuta*, from which it is instantly distinguished by voice, it is common in extensive semi-open areas, whereas the comparatively less common *minuta* occurs mostly in the immediate vicinity of woodland and along its borders. In the southwest, where another species, *imitans*, has its headquarters, the habitat separation is much more strongly marked, because *imitans* prefers woodland.

Primarily a species of the semi-open, as

indicated above, this euphonia may occur beside forest and sometimes enters the canopy to a slight extent. Generally it is seen in small groups trooping about at crown height from one partially deforested tract to another. A lone individual is occasionally met singing from a shrub. Feeding largely on mistletoe berries and other kinds of tree-borne small fruits, also examining leafless branchlets, it probably circulates in foraging rounds. Incidentally, I found this bird nest building on January 22, a very early date, near Buenos Aires in the Térraba Valley.

Its call is a somewhat resonant, thinly whistled, usually three-syllable "beebeeb," given slower or faster, almost identical to that of the largely allopatric *affinis*. Single birds as well as groups may make a sibilant twittering which sometimes ends in a hoarse "ree," almost a buzzy ring, out of which "wheeing" notes emerge at regular intervals.

***Tanagra lanirostris* (Lafresnaye
and d'Orbigny)**

THICK-BILLED EUPHONIA

RANGE: Costa Rica to Bolivia and Mato Grosso.

***Tanagra lanirostris crassirostris* (Sclater)**

RANGE: Costa Rica to Colombia and northern Venezuela.

Carriker (1910, p. 867) wrote: "This is one of the rarest of the Costa Rican *Euphoniae*, Costa Rica being to the north of the true range of the bird. It is a common bird in Panama, but in Costa Rica occurs in such small numbers that it is difficult to define its range. There is one record from the Caribbean slope at 2,000 feet, another from Cartago, near the continental divide, and three records from widely separated regions on the Pacific lowlands at altitudes varying from near sea-level to 2,000 feet. The specimen taken at Boruca was in company with *E. luteicapilla*, feeding on the berries of a variety of mistletoe." Bangs (1907b, p. 308) had recorded three specimens, taken by Underwood, in the southwest.

As this South American species is similar in appearance and apparently in habits to the Central American *lauta*, which is absent from southern Costa Rica, I suspect that its range, complementing that of *lauta*, reaches

its northern limit in the southwest. Individuals occurring elsewhere in the country would, according to this view, probably be wanderers. I met the species only in the Coto Brus Valley in the far southwest, where it was frequenting low trees in scrubby second growth and taller ones at the woodland border. There I saw it regularly, both singly and in two's. The only call I heard was a musical "churuhwee," quite different from any vocalization by *lauta*.

Mr. Eugene Eisenmann has kindly supplied the following field notes for Panama: "This bird has a wide general distribution in Panama on the mainland, to at least 4,000 ft., but is unreported from the western Caribbean slope (Bocas del Toro province) and the drier open scrubby sections of the Pacific slope. In Panama it is chiefly a species of broken woodland and second growth in areas formerly occupied by humid forest. In localities with high rainfall, such as the Caribbean part of the Canal Zone, the lowlands of Chiriquí, and the foothills on other parts of the Pacific slope, it occurs even in pastures interspersed with trees and in residential suburbs. I have never observed it in the heavier type of forest favored by *T. fulvicrissa* or in the open savanna and scrub country of the central Pacific lowlands frequented by *T. luteicapilla*, though in some places near the edge of the forest the three species occur together. . . . When not nesting, this species is usually observed in small groups, feeding on mistletoe berries or perched on an exposed or dead tree branch. I have noted a variety of vocalizations. The most distinctive is a sweet, loud, and often penetrating *chwee* (or *twee*), that may be drawn out into *chweéyoo*, and a sort of rattling *sreereereereere*. Less often I have heard a nasal *peenk* and a *tseet*. Birds watched building a nest frequently called *chee-cep*. Mrs. M. Marciaq tells me that in captivity a rather sweet irregular 'song' is sometimes uttered."

***Tanagra lauta* Bangs and Penard**

BONAPARTE'S EUPHONIA

RANGE: Southern Mexico to western Panama.

***Tanagra lauta proba* Bangs and Penard**

RANGE: Nicaragua to western Panama.

Bonaparte's is a Central American euphonia which in Costa Rica is primarily an inhabitant of the northwestern quadrant. From the Tropical Dry Forest it rises well into the subtropical belt along the northwestern divide. Spreading across the central plateau to the Caribbean side, it descends to 2000 feet in the subtropical foothills at the eastern edge of the "meseta." It also reaches the Río Frío region, perhaps from northern Guanacaste, in large numbers. It is absent from the rest of the Caribbean slope and from the Pacific slope south of the Gulf of Nicoya. Occurring with *affinis* in the dry-forested northwest, it is more closely associated with tall woodland than its scrub-inhabiting congeneric neighbor. It is uncommon on the deforested central plateau, but increases in numbers in the more humid and generally wooded Caribbean side, in which limited range it nests but perhaps is not resident. I found it extraordinarily abundant, locally, on the Pacific face of the Cordillera de Tilarán.

A nonforest species, it prefers stands of trees, woodland borders, and shaded country of plantation type. Usually it keeps fairly well up, often quite high in the trees, but occurs to below eye level when nesting. Outside the breeding season it is encountered as a rule in small, active groups that apparently wander about. It subsists to a large extent on mistletoe berries and also on other kinds from which it expresses the juice with its bill. Having seen it stand sideways on vertical trunks, I would guess the bird capable of searching boles and bare limbs.

The bird is a poor musician, with a large repertory. It utters a fragmented song of somewhat vireo-like, impure phrases, an unclear "yúhdeedeedeet" and a "chroo chroot," both of them recognizably that of a euphonia, a hoarse "werrrp," unmusical warbler-like "songs," some of them strongly patterned or fuzzy and jumbled, and several other cries. Occasionally it gives, unclearly, the typical "bebebebe" of a euphonia.

***Tanagra gouldi* (Sclater)**

GOULD'S EUPHONIA

RANGE: Southern Mexico to northwestern Panama.

***Tanagra gouldi gouldi* (Sclater)**

RANGE: Southern Mexico to northern Costa Rica.

***Tanagra gouldi praetermissa* Peters**

RANGE: Southeastern Costa Rica and northwestern Panama.

Gould's Euphonia, a Caribbean species, is most common in the humid tropical belt. It rises in places into the lower subtropical belt, particularly along the central highlands, and also passes through gaps in the Guanacaste Cordillera to its humid-forested Pacific face. It is absent from the subhumid northwest. The population *praetermissa*, at the southern end of the species range, is distinguishable by its average shorter wing length. This is a clinal character of decreasing size that, progressing rapidly from northern to southern Costa Rica, includes all individuals only in northwestern Panama.

Essentially a forest-inhabiting euphonia, it is seen most often along the borders of forest and in adjacent shaded plantations and tree-scattered clearings. In the forest it generally frequents the middle and upper levels; sometimes it descends to the understory. Along the overgrown forest border it keeps as a rule rather low in small trees and tall shrubbery. Yet a few yards away in the semi-open it occurs at all heights in the trees. It is seen in pairs and small groups, seldom alone. In forest it usually accompanies mixed bird parties. Because of its woodland habitat, I surmise that it has a more varied diet and feeds less on mistletoe berries than do most euphonias.

Its variable short call is devoid of musical quality. The bird also makes a soft little trill, a weak chirp, an unclear, somewhat euphonia-like whistled note, and a long-continued jumble of kissing and sharp sounds. As with several other euphonias the female calls, too.

Tanagra imitans* Hellmayr*TAWNY-BELLIED EUPHONIA**

RANGE: Southwestern Costa Rica and adjacent Panama.

The Tawny-bellied Euphonia, a southern Central American endemic, is, in Costa Rica,

confined to the humid-forested Pacific slope southward from the entrance to the Gulf of Nicoya. A specimen from San José "is accidental to say the least, and may probably be an escaped cage bird" (Carriker, 1910, p. 871). A record from Miravalles turns out to have been an error in transcription. The species is most abundant in the Térraba-General region and thence southward through the Golfo Dulce lowlands. It occurs largely in the tropical belt and perhaps just as commonly in the lower subtropical belt. In the Dota Mountains it has been taken at 4500 feet, undoubtedly its upper limit. I did not happen to find it in the subtropical Cañas Gordas district.

In Costa Rica the Tawny-bellied apparently fulfills in the Pacific southwest the function of *gouldi* on the Caribbean side. Like *gouldi* it is a forest-inhabiting euphonia that occurs also along woodland borders and in the adjacent shaded semi-open at all heights. It seems to differ in that it is usually seen singly or in pairs, only occasionally in three's. It makes several sorts of cries, among them a two-part harsh "song" beginning with a rising roll mixed with churrs and ending with a churring trill. Another is a distant-sounding, throaty, wrenlike "chir-tyútyut-yutyuh." A frequent call, something like "yoo-wítsit," brings to mind *gouldi* and *minuta*. Varied to "yuhtitít" it suggests the tanager *Piranga flava*.

Tangara florida* (Sclater and Salvin)*EMERALD CALLISTE**

RANGE: Costa Rica to western Colombia.

Tangara florida florida**(Sclater and Salvin)**

RANGE: Costa Rica and western Panama.

The Emerald Calliste is an uncommon Caribbean species that inhabits the wet foothills, ridges, and mountain slopes from the upper limits of the tropical belt into the lower half or two-thirds of the subtropical belt. It has been found only in an arc extending along the Cordillera Central, from the northwestern side of Poás Volcano to the Reventazón drainage. Almost surely it continues along the Talamanca Cordillera, whence it has not been recorded, to Panama. It may or may not be present on the north-

western divide. In my experience it prefers the cool lower subtropical portions of its range. Most records date between August and December, thus suggesting postbreeding dispersal. My own observations are restricted to that time of year, when the birds do seem to be traveling about. Future observations should broaden the range of the species and help fix its seasonal movements.

As a rule I met this calliste only when carefully examining a mixed assemblage of active arboreal birds trooping along woodland edges or visiting tree-scattered clearings in forested country. Indicators of its possible presence include almost without exception the congeneric *icterocephala* and *chrysophrys*, sometimes *larvata* and *gyrola*. If the Emerald is with them, then several individuals usually are present. In this respect it is similar to the rarer *Chlorospingus canigularis* and the more abundant *T. chrysophrys*. Its habits seem to be the same as those of most members of its genus. Like the others, it makes characterless weak "tsuck" 's or "tsick" 's which may be run into a twitter.

***Tangara chrysophrys* (Sclater)**

SPECKLED CALLISTE

RANGE: Costa Rica to western Ecuador and Venezuela.

***Tangara chrysophrys eusticta* Todd**

RANGE: Costa Rica to eastern Panama.

The Speckled Calliste is primarily an inhabitant of the cool and wet subtropical belt along both slopes. On the Caribbean side its known range coincides almost exactly with the limited one of *florida*, but there are many more records, especially from the Reventazón drainage, and I found it farther south on the approach to the east-central sector of the Talamanca Cordillera. It appears to be considerably more common on the Pacific side, from the Dota Mountains to the Panamanian frontier, almost exclusively at upper tropical and lower subtropical elevations; there, though met regularly, it is nevertheless the least common member of its genus. It is not known from the northwestern cordilleras. Largely frequenting the slopes of the interior mountains, it is nearly restricted to the subtropical belt on the Caribbean side, rises into the lower montane belt in the Dota

region, and ranges through the upper tropical belt as well as in the subtropical belt in the far southwest.

The species occurs in forest, along woodland edges, in thinned openings, and in tree-scattered clearings. Usually it is seen in two's and three's, also in small groups, but seldom singly, almost always accompanying mixed bands that include the congeneric *icterocephala*, *larvata*, and *gyrola* as well as other kinds of birds foraging busily and constantly on the move. Acting no differently from its congeners, it searches foliage and scans bare branches for animal and plant food. I have even seen it standing horizontally sideways on a vertical trunk. Its voice is undistinguished, as is that of *larvata*, for example, but, lacking the weak resonance of the latter, the bird makes only twittering weak chips and a weak "tsit," alone or in series.

***Tangara icterocephala* (Bonaparte)**

SILVER-THROATED CALLISTE

RANGE: Costa Rica to western Ecuador.

***Tangara icterocephala frantzii* (Cabanis)**

RANGE: Costa Rica and western Panama.

The species is distributed over the humid-forested parts of both slopes, from the first foothills upward into the lower montane belt. It is found in greatest numbers at subtropical elevations on the Caribbean versant of the central highlands, occasionally descending below the lower limits of the belt and rising commonly above its upper limits. From the Cordillera Central it extends northwestward along the continental divide at least as far as Tenorio Volcano. Where ridges and foothills reach almost to the coast in the extreme southeast, I saw it in October, a time of year in which to expect postbreeding wanderers, and I met it several times during November and December in the northeastern lowlands, not far from foothills. In the southwest, it is abundant only in the cool portions of its range on the slopes, foothills, and spurs of the Talamanca Cordillera, though locally it is not uncommon in the upper tropical belt.

Intimately associated, for the most part, with cool wet woodland, the Silver-throated Calliste occurs in forest but is seen more often along edges and in tree-scattered clearings bordered by forest. It travels as a rule in

groups of a few to many individuals, occasionally in two's, in company with other tanagers, warblers, greenlets, and furnariids. It often impresses one as being the dominant species, perhaps because of its seemingly larger numbers owing to its eye-catching color and constantly given note. Generally it keeps fairly low in the trees, down to shrub height, seldom above medium heights except in forest. Searching busily, fluttering and stretching for small fruits, it forages as do its active companions. Also, it carefully, almost deliberately, examines mossy slender branches, along which it moves in spurts and habitually turns sideways to peer at their under sides. The voice of this calliste is perhaps the least developed among the Costa Rican members of its genus. Yet, in contrast to the others, its single or paired buzzy notes, apparently never run into series, are often specifically recognizable.

Tangara larvata (Du Bus)

GOLDEN-MASKED CALLISTE

RANGE: Southern Mexico to northwestern Ecuador.

Tangara larvata larvata (Du Bus)

RANGE: Southern Mexico to northern Costa Rica.

Tangara larvata centralis (Berlepsch)

RANGE: Northeastern Costa Rica to Caribbean slope of Veraguas, Panama.

Tangara larvata franciscae (Slater)

RANGE: Pacific slope, southern Costa Rica to central Panama.

The Golden-masked Calliste inhabits the humid life zones on both slopes; it is absent from the central plateau and virtually all the dry-forested Pacific northwest. The race *larvata*, which enters Costa Rica from the north, intergrades along the northern and eastern sides of the Cordillera Central with *centralis*, which is distributed southward into Panama. The Caribbean birds are generally very common, especially in the tropical belt (though seldom recorded from the extreme southeast), from which they rise in fair abundance into the subtropical belt along the central highlands and uncommonly along the north-

western divide north from the Arenal gap. The Pacific race, *franciscae*, which occurs southward from the entrance to the Gulf of Nicoya and has a similar vertical distribution, is most abundant in the far southwest.

The species is usually met trooping about in small bands, seldom singly. Though occasionally seen in the tops of great trees in forest, it prefers the semi-open, such as plantations, pastures with trees, and parklike areas, often close to houses. It forages either on bare or heavily foliated branches in small- to medium-sized trees, shrubs, or roadside hedges, and includes fly-catching among its activities. The lively colorful groups are often associated with other tanagers, honeycreepers, vireos, migrant warblers, even saltators and robins, most of which frequent the same sorts of country as *larvata*. These constitute an assemblage different in species and to a large extent represent families different from the bands that rove in forest. The forest birds may be very active individually, but as a group they travel slowly, cutting a swath, so to speak, and they flit rather than fly. The birds of the semi-open, of which *larvata* may be taken as an example, are apt suddenly to fly off across a clearing, so that the foraging course appears arbitrarily erratic.

Notwithstanding their poor assortment and quality, the unremarkable notes are often specifically identifiable. The "song" consists of a rapidly repeated "djit" or "tch" having an odd weak resonance; the note is characterless when given singly. What may be an alternate "song" is an excited continuous metallic "tik" (or "tsik") interpolated by ticking trills. A lone bird atop a small tree may repeat endlessly a warbler-like "tsip" or "tsep." The species also makes a sharp "dzit" approaching the buzzy one of *icterocephala*.

Tangara inornata (Gould)

PLAIN-COLORED CALLISTE

RANGE: Costa Rica to Colombia.

Tangara inornata rava Wetmore

RANGE: Caribbean Costa Rica and adjacent northwestern Panama.

The Plain-colored Calliste was not recorded in the literature for Costa Rica prior to my report (Slud, 1960, pp. 112, 113, 120).

The Museo Nacional de Costa Rica does, however, possess two specimens (M.N.C.R. Nos. 3900, 6035), a male and a female, taken at Jiménez, in the northeastern sector of the country, on January 2, 1890, and February 7, 1891, respectively, by Cherrie and by Alfaro and Carranza. The specimens unquestionably belong to the race *rava*, recently described from Bocas del Toro Province, Panama, by Wetmore (1963b, p. 9). This geographically disjunct, well-differentiated form is distinguishable at a glance from *languens*, which extends from central Panama into Colombia.

In Costa Rica the species appears to be confined to the lower tropical belt along the Caribbean slope. I met it, in all, at three widely separated localities in the lowlands: the Sarapiquí region (northwestward from Jiménez), the coastal plain inland from Puerto Limón, and the extreme southeast next to Panama. The environments were similar: cacao plantations with scattered shade trees and tree-dotted clearings not entirely enclosed by woodland. The species is resident, as I found it every month in the year.

Plain-colored, this calliste obviously differs in appearance from its seven brightly to gaudily hued and patterned Costa Rican congeners. Its foraging habits, while generally similar to those of the other species, are by no means peculiar to the genus. They most closely resemble those of *larvata*, the only common calliste of the Caribbean lowlands, and the two species may occur together in the same habitats. The Plain-colored frequents both leafy and unfoliated branches, as does *larvata*, but shows a decided preference for bare twigs, not only as a source of food but also for perching. Constantly turning sideways to examine the under sides of branches, it searches somewhat more deliberately than *larvata*. Indeed, the Plain-colored alights with its head already bent downward, or lowers it immediately thereafter, prepared to scan the branch or twig, along which it may move laterally with quick little steps; *larvata* may behave similarly, but in neither so marked nor habitual a manner. Also, the Plain-colored often sits quietly in open view on its leafless perch. Sometimes it makes short and fluttering fly-catching sallies. These I have

noted also in *larvata*, seldom in other members of the genus.

The bird apparently restricts its activities to the tree-scattered semi-open in generally wooded country. Usually it is seen at medium heights, occasionally higher, in the trees. It is gregarious in that, as a rule, several individuals keep together. I have found it also in three's, but did not happen to observe it singly or in two's. It seems to be sedentary in an area, within which it moves as a group of several from site to site. Once, in April, I came upon three individuals chasing one another among semi-isolated large trees in a new clearing. Fluttering smoothly and slowly while continuously "ticking," they were weaving about the leafy branches along established aerial pathways at a fair height from the ground. The birds engaged in these "playful" pursuits for appreciable lengths of time, hence I probably witnessed their courtship. I have heard a rapid weak twitter as the only other utterance. Probably the bird makes weak chips, too.

Tangara gyrola (Linnaeus)

BAY-HEADED CALLISTE

RANGE: Costa Rica to Bolivia and Brazil.

Tangara gyrola bangsi (Hellmayr)

RANGE: Costa Rica and western Panama.

The distribution of this calliste is similar to that of the congeneric *chrysophrys*. On the Caribbean side it is virtually confined to the subtropical belt along the slopes and foothills of the central highlands and probably the length of the Talamanca Cordillera, where I found it on the approach to Cerro Chirripó. It is not recorded from the northwestern divide, where it might well be present along the Cordillera de Tilarán, nor from all the Pacific northwest. Though it has been found on the Pacific portion of the central plateau, I believe the specimens were taken on the neighboring wooded slopes. In the southwest it ranges through the humid life zones from the Dota region and the entrance to the Gulf of Nicoya to Panama; it is especially common from the General region southward. Here on the Pacific side this subtropical species is regularly found downward into the tropical belt, even to the coastal lowlands at the base of the foothills.

The bird inhabits forest, the borders of forest, and adjoining tree-scattered openings. It usually occurs in small bands, also in two's and three's, either as a self-contained unit or as part of a mixed band of small birds traveling through the trees. In general, it forages at medium heights along edges or in second-growth woodland, sometimes down to eye level in fruiting shrubs; it rises much higher in forest. A confirmed twig and branch searcher, perhaps more so than any calliste with the exception of *inornata*, it behaves as predictably as the Blue Tanager.

Its note is a piercing "tsst" or some similar alteration. Occasionally the bird delivers rather slowly a scratchy little "song" of five or six notes, like that of a Blue Tanager if weakened, which is characterless yet sufficiently patterned to distinguish it from the formless twitterings or prolonged "tickings" of some other callistes. A rapidly repeated twittering note introduced by a sharp "squee" is also given.

Tangara lavinia (Cassin)

LAVINIA'S CALLISTE

RANGE: Guatemala to western Ecuador.

Tangara lavinia cara (Bangs)

RANGE: Guatemala to Costa Rica.

Lavinia's Calliste in Costa Rica, so far as known, is a Caribbean species that inhabits a very humid, narrow zone following the upper tropical and lower subtropical belts along the Cordillera Central and continuing along both slopes of the northwestern divide north from the Arenal gap; it is almost surely present, too, on the Caribbean face of the Cordillera de Tilarán. Aside from a lone record at sea level near Puerto Limón, the species has not been found southward toward Panama or northward in the coastal-plain lowlands. Hence its latitudinal distribution complements that of the similar-plumaged *gyrola* which sweeps into the country from the south. This situation is best marked along the northwestern divide, where *gyrola* is lacking and *lavinia* is at its greatest abundance. The two meet and are partially sympatric along the Cordillera Central, but here *lavinia* is centered at least 1000 feet lower than *gyrola*.

The species seems to be generally uncommon to rare. Personally, I met it almost exclusively along the northwestern divide, mostly on the humid Pacific slope of the Guanacaste Cordillera, from the northern tip of the Cordillera de Tilarán to Rincón de la Vieja Volcano, but there I found it consistently. A forest-based species, it occurs in heavy woodland, patches of forest, and adjacent tree-scattered clearings. It forages at all heights from quite low to the crowns of tall trees. This brightly marked little tanager travels about actively through the trees, usually in small groups, sometimes in pairs, which either accompany other kinds of birds or more often do not. It seems to act no differently from most members of its genus.

Its voice is not unlike that of *gyrola*, than which it is somewhat better developed. Usually the bird makes weak "tst" 's, which may be strengthened to the sharp "tswist" of a Palm Tanager. Its "song" is a patterned, soft "seé ts·ts·ts·ts·ts" similar to that of *gyrola*, a sharp "tsreet tsreet tsreet," and an "er·erí" that sounds like a creaking hinge.

Tangara dowii (Salvin)

DOW'S CALLISTE

RANGE: Costa Rica and western Panama.

Dow's Calliste, the only member of its genus at the very high altitudes, occurs most abundantly from timber line downward through the lower montane belt. Locally and not uncommonly it descends into those portions of the subtropical belt affected by cloud-forest conditions. It is common to abundant in the central highlands, especially on the Caribbean versant. It is known from the Dota Mountains, and I met it on the Caribbean approach to the northern end of the Talamanca Cordillera, the length of which it is almost surely present though still not recorded. I found it, too, on the Cordillera de Tilarán in the northwest, where it was not uncommon; there is no report from the Guanacaste Cordillera.

A woodland species, it is met in forest, along forest borders, in tangled new growth in or beside forest, and in tree-scattered clearings next to forest. It almost always travels about in small groups, sometimes in two's,

usually in the company of mixed bands of tanagers, warblers, and other small birds of similar behavior. Occurring from the understory to medium heights in the trees, it forages by climbing and hopping among branches and constantly examining foliage. It also peers myopically at the sides and under sides of its perch, but not so markedly as do many other tanagers, nor does it flit so much amid the foliage as do other callistes. Instead, it flies a moderate distance swiftly and directly from one stopping place to another and dashes from branch to branch. Rather than combing the trees methodically, it seldom spends much time at a particular site. It is a very poor vocalist, uttering only thin, sometimes piercing little "tit" 's or "tsit" 's, alone or in twitters, hardly distinguishable from those of many neighboring birds.

Buthraupis arcae Sclater and Salvin

BLUE-AND-GOLD TANAGER

RANGE: Costa Rica and western Panama.

Buthraupis arcae caeruleigularis Ridgway

RANGE: Costa Rica.

The Costa Rican status of this species has changed little since Carriker wrote (1910, p. 866): "This is one of the rare tanagers of Central America, being confined (so far as now known) to the northeastern portion of Costa Rica, around the northeastern slopes of the Volcanoes Turrialba, Irazú, Barba, and Póas, from an altitude of about 1,000 feet up to 4,000 feet (Hondura). It is rare so high as La Hondura, but one specimen having been taken there. It is found only in the dense tangled jungles of the rain-soaked Caribbean foot-hills, keeping near the ground in the most impenetrable parts of the undergrowth. I never heard this bird sing, but it has a tanager-like call, or note of alarm, resembling that of *Caryothraustes* or *Phoenicotheraupis*."

In addition to the above, I found it a little farther to the southeast on a 3000-foot ridge overlooking the Reventazón Valley and at the northern tip of the Cordillera de Tilarán overlooking Lake Arenal. Its distribution is probably more or less continuous along the rain-forested subtropical slopes. Possibly it includes the Caribbean side of the Talamanca Cordillera, whence it has not been recorded. I met the bird in one's or two's

along the borders and in patches of very wet subtropical forest. Usually it was with several species of *Tangara*, but also unaccompanied, in the same localities as the rare or very local flycatcher *Phylloscartes supercilialis*. Generally it kept below medium heights in heavily foliated trees and the upper portion of tall shrubbery mixed with trees. Heavy-bodied and relatively inactive, suggesting an oversized red-eyed euphonia, it foraged for small fruits. It was mostly silent but sometimes uttered a weak "tsick," the only sound I heard.

Thraupis virens (Linnaeus)

BLUE TANAGER

RANGE: Southern Mexico to Bolivia and Brazil.

Thraupis virens cana (Swainson)

RANGE: Southern Mexico to Colombia and Venezuela.

The Blue Tanager is one of the most common birds almost everywhere from either coast upward through most of the lower montane belt. Essentially a species of the semi-open, dwelling both in country and town, it has not delayed in occupying vast areas opened by man. Its principal requirement is trees on which to perch, nest, and seek food. Though absent from solid woodland, it is common along the borders. It is distinctly uncommon, however, in extensively forested regions. It is local at humid places in the dry-forested northwest; otherwise it is scarce or lacking.

The "viuda" is fond of companions of its own kind and active and noisy in their society. Hence it is hardly ever seen alone but, as a rule, in parties of varying size, also in two's. When one bird takes to flight, it is often followed shortly by a second; they do not fly side by side. This pairing is not to be observed, however, when the birds are at rest. As an inevitable sequel to the act of alighting, usually on a less heavily foliated portion of a branch, the bird after a pause of variable length habitually directs its head downward, often with its body inclined forward precariously, to examine meticulously the under side of the branch. Other tanagers, especially the congeneric *palmarum* and several callistes, as well as some other kinds

of birds, predictably do this, too, with the same regularity and deliberateness. The abundant Blue Tanager, less shy and easier to observe than the others, serves as the type possessor of the habit. It also creeps along branches and clings sideways to vines, often twitching from side to side as though about to take off. It takes fruits in addition to animal prey and sometimes engages in fly-catching.

Its song is undistinguished as in many tanagers. Consisting of a number of light squeaks on about the same level, its specifically distinctive unhurried delivery and lack of pattern contrast with the similar but more rapid sets of squeaks of *palmarum*. Its usual call note, a squeaky "siss," is characterless yet different from the sharper, arresting one of *palmarum*.

***Thraupis palmarum* (Wied)**

PALM TANAGER

RANGE: Nicaragua to Bolivia and Brazil.

***Thraupis palmarum atripennis* Todd**

RANGE: Nicaragua to Colombia and northwestern Venezuela.

The countrywide range of the Palm Tanager coincides with that of the congeneric Blue. It does not reach so high an elevation as the Blue, though common enough on the central plateau. Preferring semi-open and park-like areas, plantations, tree-lined roadsides, and woodland borders, its habitat and habits hardly differ from those of the Blue. In general, it is outnumbered by the Blue, yet it is much more abundant than the Blue in extensively forested regions. It is rare in the Pacific lowlands north from Puntarenas.

The strictly arboreal Palm Tanager usually, though not necessarily, moves about higher in the trees than the Blue. Like the latter it is generally seen in groups, occasionally in two's or three's, actively trooping from one site to another. Its flight is swifter and stronger, its activity freer, longer-ranging, and tuned to a higher pitch, so to speak, than that of the Blue, yet it is more secretive and harder to observe. Though it visits all sorts of trees, it does indeed perch on palm fronds, as its name implies, with notable frequency. When foraging, its preoccupation with branches and twigs duplicates that of the Blue. Closely examining the bark, it regu-

larly turns sideways to scrutinize the under sides of limbs for small living prey, and it eats many sorts of fruits. Sometimes it fly-catches. The perched or standing bird is almost always seen posed horizontally, rarely if ever upright. In bodily proportions it is relatively a longer bird than the Blue Tanager.

Vocally it is similar to but readily distinguished from the Blue. Its usual note is a piercing metallic "wheerst," "weert," or "whit." Its call, or "song," consisting of several rapid series of squeaks intermixed with a few longer squeezed-out squeaks, is similar to that of the Blue in quality but not in form. The notes are shorter, quicker, greater in number, and delivered as an almost twittering jumble.

***Ramphocelus passerinii* Bonaparte**

PASSERINI TANAGER

RANGE: Southern Mexico to western Panama.

***Ramphocelus passerinii passerinii* Bonaparte**

RANGE: Southern Mexico to northwestern Panama.

***Ramphocelus passerinii costaricensis* Cherrie**

RANGE: Southwestern Costa Rica and adjacent Panama.

The Caribbean form, *passerinii*, is distributed commonly throughout the tropical and lower subtropical belts. It rises casually to the lower montane belt in the central highlands, perhaps also on the Talamanca Cordillera, yet it barely reaches the eastern edge of the central plateau. It also spreads sparingly to the Pacific slope of the northwestern divide, mostly northward from the Arenal gap, but there I found it locally abundant. It is present, too, in the lowlands that border the Gulf of Nicoya, north of the latitude of the town of Puntarenas. The Pacific *costaricensis* occurs from Puntarenas southward, becoming increasingly common to abundant in the far southwest and rising well into the subtropical belt, possibly higher.

The species inhabits clearings with small trees, plantations, thickets, second growth, and woodland edges. It does not enter forest (except occasionally at canopy height in the southwest), but it does occur along periodi-

cally flooded banks of larger rivers in forested country. It is especially common, sometimes extraordinarily abundant, in cultivated and regenerating cutover areas, often near dwellings. Usually it is met in small parties composed in large part of birds in female plumage; sometimes one sees a partly albinistic individual. The members are active and noisy and spend most of their time in thickets or other dense cover, yet regularly expose themselves and dash about a good deal; individuals sometimes go to the ground.

To my ears and those of Carriker (1910, p. 852) the two races sound much alike. *Costaricensis* is heard more commonly and is perhaps a bit more musical than *passerinii*. The indifferent song, deficient in beauty, grace, and character, suggests that of many other birds; notwithstanding, it is better than that of tanagers in general. It is made up of loosely connected robin- or vireo-like inconsequential phrases that lack the mellowness of the robin and the decisiveness of the vireo. Usually, the same, rather unclear, partially burred phrase is repeated with an occasional change of inflection. The male also has a flight song. Two self-identifying call notes are a confidential "hist" (or "psst" or "ritst") and a throaty "churr" or "charr." Also given are a metallic hiccup, like the weakened one of an araçari (*Pteroglossus*), and a reedy "ik" or "ek."

***Phlogothraupis sanguinolenta* (Lesson)**

CRIMSON-COLLARED TANAGER

RANGE: Southern Mexico to northwestern Panama.

***Phlogothraupis sanguinolenta aprica* Bangs**

RANGE: Nicaragua to northwestern Panama.

The Crimson-collared Tanager is exclusively a Caribbean species which ranges from the coast well into the subtropical belt fronting the central highlands. Northward from Lake Arenal it spreads locally to low portions of the northwestern divide, barely reaching the Pacific slope. Though widely distributed and by no means rare, yet, except for a few places, it is common nowhere. An exception is the Arenal gap, where I found it in a conspicuously large concentration in early February. Richmond (1893, p. 489) noted that

in the fall "there is a tendency to gather in small flocks. At this period there appears to be something of a migration of the species, or an influx of individuals from other localities, and the bird might then be said to be common. An increase in numbers was noticed late in August." Otherwise, unlike the gregarious *Ramphocelus passerinii*, it occurs in two's almost without exception. Should one bird be seen, another will almost certainly be found lurking close by.

The species occurs as a rule along the borders of woodland, either virgin or second-growth, where it is found in thickets, shrubbery, abandoned banana plots, and at overgrown stream banks—the same sort of habitat favored by *Ramphocelus passerinii*. Usually it keeps several yards above the ground, that is, somewhat higher than *Ramphocelus*, and it is a wider-ranging, freer-living bird, so to speak, than *Ramphocelus*. It delivers from an elevated perch a leisurely song, vaguely suggesting the faster one of a seedeater (e.g., *Sporophila aurita*), composed of measured, metallic, rather penetrating, sibilant short phrases, with high-pitched "sissing" notes randomly interspersed. Another patterned call or song consists of a "wirss" first given singly and rising, then doubled on the same level. The call note is a rising slow "whirsst" or "chweerst" like that of a Palm Tanager.

***Piranga rubra* (Linnaeus)**

SUMMER TANAGER

RANGE: Breeds in United States and northern Mexico; winters from Mexico to Bolivia and Brazil.

***Piranga rubra rubra* (Linnaeus)**

RANGE: Breeds in central and eastern United States; winters from Mexico to Bolivia and Brazil.

The Summer Tanager arrives by the second week of September, but does not become common until the end of the month or a little later in October, and remains until at least the end of April. In the winter it is common to abundant over most of the country from both coasts upward through the lower subtropical belt, including the northwestern divide and the central plateau; it rises, uncommonly, well into the montane belt. Almost

any kind of country, whether open woodland, patches of woods, forest borders, or shaded plantations, seems to suit the bird, which generally keeps at or below medium heights in the trees. Occasionally it is met at the lower levels in places such as wooded swamps inside solid forest.

Though numerically abundant, it is solitary and apparently sedentary during most of its winter stay. Its foraging behavior is very varied. Often the bird perches inactively within the foliage, then moves, usually, in a dashing manner. It flutters to leaves and hovers at foliage in order to snatch an insect or grub or to pluck a berry, then falls to a nearby perch where it swallows the morsel or squeezes the juice from small fruits. I have also seen it fly-catching from brush and attending army ants. Its "chíkatuk," alone or repeated, sometimes followed by a "chikik," is a commonly heard call.

***Piranga flava* (Vieillot)**

HEPATIC TANAGER

RANGE: Southwestern United States to Bolivia and northern Argentina.

***Piranga flava testacea* Sclater and Salvin**

RANGE: Costa Rica and Panama.

The Hepatic Tanager is a subtropical species that occurs on both slopes, with its center of abundance between 2500 and 4000 feet. It hardly rises into the lower montane belt but does descend to the upper limits of the tropical belt, especially in the southwest. In the northern half of the country, it is largely restricted to the Caribbean versant of the central highlands, from which it extends northwestward along both slopes of the continental divide at least as far as Rincón de la Vieja Volcano. In the southern half, it has not yet been recorded from the Caribbean slope of the Talamanca Cordillera, but on the Pacific side it is found from the Dota region southward on the slopes and spurs of the mountains to Panama.

Confined to the cool, humid to wet life zones, the species occurs in forest and along its borders in hilly country. As a rule it keeps high in the trees, yet I observed a male feed a fledgling perched only 2 feet up in forest undergrowth. It troops about singly or some-

times in two's and apparently covers a large territory daily. An active bird, its foraging activities include looking at the under sides of branches as do a number of other tanagers. When crossing open places, it is seen to have a distinctive dipping long-bounding flight, like that of a woodpecker.

But for its diagnostic call note, the very presence of the species in an area might pass unnoticed. Often given in flight, it sounds like "yúhtitdit," sometimes with an extra "yuh" at the end, at other times like "chúhtih" or "chúhtiti." Its jerky song, buzzy in part, going up and down like that of the yellowthroat *Geothlypis semiflava*, is a series of connected vireo-like phrases.

***Piranga olivacea* (Gmelin)**

SCARLET TANAGER

RANGE: Breeds in eastern North America; winters from Colombia to Bolivia.

The Scarlet Tanager is a regular transient in spring and fall. Carriker (1910, p. 855) called it a rare winter visitor, but I know of no winter record. Fall-plumaged birds pass southward from the last week of September until early November. The species returns northward in breeding dress from about the third week of March through April, perhaps into early May. Richmond (1893, p. 490), however, observed it early in March in the Río Frío region. An extraordinary record (M.N.C.R. No. 8873) is that of a female collected July 16, 1893, at La Estrella de Carago. The bird migrates mostly through the Caribbean lowlands, also along subtropical ridges; it is very uncommon on the central plateau. On the Pacific side it has been reported only from El General and Esparta, and I found it at Hacienda Miravalles.

The bird is usually seen in two's or three's, of the same sex or not, seldom alone. Generally it frequents leafy branches from below medium heights often to very high in the trees in shaded plantations, along forest borders, and at cuts in wooded areas. It perches quietly as a rule, but suddenly flutters to pluck a food item from the foliage or flies off rapidly some distance. When not inside the foliage, the male is as conspicuous as a scarlet flower. I never heard the bird make a sound.

***Piranga leucoptera* Trudeau**

WHITE-WINGED TANAGER

RANGE: Southern Mexico to Bolivia and the Guianas.

***Piranga leucoptera latifasciata* Ridgway**

RANGE: Costa Rica and western Panama.

The uncommonly seen White-winged Tanager has been known primarily from the Caribbean versant of the central highlands, also the mountains forming the southern edge of the central plateau and the Dota region. In addition, I met it on the northeastern approach to the Talamanca Cordillera, along the Pacific slope of the Talamanca Cordillera in the southwest, and on the Pacific slope of the Cordillera de Tilarán. The species is probably distributed continuously along both slopes from the Arenal gap to Panama; it is not reported from the Guanacaste Cordillera. It is most common in the upper two-thirds of the cool and wet subtropical belt. It is seldom seen lower, but rises in decreasing numbers through the lower montane belt and, locally, can still be met regularly at the lower limits of the montane belt.

This forest-based little *Piranga* is confined to very humid, heavily wooded areas. Inside forest or along its borders and at breaks it keeps as a rule from medium heights to high in the trees. To my great surprise I found it, just above the ground, in pairs and small groups, tamely and leisurely examining earthy, overturned stumps at the juncture of second-growth scrub and open pasture. This was in the Cañas Gordas district, the only place where I found it very common. Usually, in Costa Rica, the species is seen traveling about very actively in small companies, but also singly and in two's, of its own kind or together with mixed bands of small tanagers, warblers, and arboreal ovenbirds. Besides foraging amid foliage, it searches, perhaps habitually, the encrusted bark of leafy branches.

Its short, sharp, unmusical notes are the sort one associates with mixed arboreal flocks; I did not hear a "song." The bird makes a sharp, slightly rising "whirst" or "weerst" like that of the Palm Tanager, a characterless "stchírp·sr," a metallic "ch-toór," a "titting" of the kind produced by an

air compressor, a doubled "squick," and a patterned "squick squíck·squíck." A small band gives off metallic twittering and pulley-like noises.

***Piranga ludoviciana* (Wilson)**

WESTERN TANAGER

RANGE: Breeds in western North America; winters from Mexico to western Panama.

The Western Tanager, a migrant seldom recorded in southern Central America, is very uncommon to rare in Costa Rica, where I met it at three localities. There seem to be four other reports in all, two of them by Charles H. Lankester, who collected the first Costa Rican specimen in January, 1904, at Abangares, near the head of the Gulf of Nicoya, but did not see the species again until 1954, at Las Cóncevas, near Cartago. The bird arrives by the last week of September, possibly earlier, and remains until at least the first part of April. It has not been recorded from the southern half of the country, which transients to and from Panama must surely cross.

During migration, when it occurs in groups of two or more rather than singly as in the winter, it has been found at Miravalles alongside the northwestern divide, on the Caribbean side of the central plateau, and in the northeastern lowlands. Birds in transience apparently prefer shrubby vegetation and low trees and seem to avoid forest but may occur near it in the semi-open. This species impressed me as a much more active forager than its migrating congeners, *olivacea* and *rubra*. In the winter it is known only from the Tempisque basin, including the head of the Gulf of Nicoya. There I found it frequenting the low trees and patches of scrubby woods in the ranch lands and lagoon country. Probably it winters in Costa Rica regularly but in very small numbers. It and the much more abundant *rubra*, both migrants, are the only representatives of their genus in the Tropical Dry Forest.

***Piranga bidentata* Swainson**

FLAME-COLORED TANAGER

RANGE: Mexico to western Panama.

***Piranga bidentata citrea* van Rossem**

RANGE: Costa Rica and western Panama. The Flame-colored Tanager is known al-

most exclusively from the mountainous central part of the country, including the Dota region. It may indeed be absent from most of the northwestern divide, yet I would expect it on the Cordillera de Tilarán. Though previously unrecorded, it probably occurs sparsely the length of the Talamanca Cordillera, where I found it only in the Cañas Gordas district close to Panama.

In the central highlands it is common from timber line downward through the montane and lower montane belts and, in places, to the upper subtropical belt. It is occasional on the central plateau as a visitor from the facing slopes. Rather than occupying a particular watershed, its distribution covers the mountain crests, but in contrast to most other highland birds, this species seems to be much less abundant on the Caribbean-facing north side of the Cordillera Central than on the slopes that overlook the central plateau. I believe this reflects a preference for opened woodland and its borders as well as parklike areas, provided these alternate with forest.

The bird is seen singly and in pairs, also in gatherings of several individuals, and usually keeps well up in the trees, though a group may descend to shrubs and fences in open places. An active bird, it seems to roam about considerably, whether alone or in companies. This rather pointed-winged, long-tailed, large *Piranga* flies rapidly and high across openings.

Vocally it brings to mind the migrant *rubra* and *olivacea*. Its song usually consists of a succession of trios of two-syllable notes, buzzy or burred, yet musical as those of a robin: "churweé chirroó churreéz" or "chooweéz weézweéz weézweéz." Its call note is a musical "chirrup" or "chillík," sometimes with an additional short syllable in the middle.

***Chlorothraupis carmioli* (Lawrence)**

CARMIOL'S TANAGER

RANGE: Nicaragua to Colombia, Peru, and Bolivia.

***Chlorothraupis carmioli carmioli* (Lawrence)**

RANGE: Nicaragua to northwestern Panama.

Carmioli's Tanager is restricted to the Caribbean slope the length of the country. It

is common to abundant in the tropical belt and rises here and there to the lower subtropical belt. It barely reaches the Pacific face of the Guanacaste Cordillera, as I found it only at a gap near Cerro Santa María; possibly it occurs at other low passes. Having met it mostly in broken terrain, I consider it essentially an inhabitant of low foothills from which it spreads to adjacent portions of the coastal plain. It is strictly a forest bird largely confined to the understory down to a few feet from the ground, but it also rises a bit to the lower middle forest.

Throughout the year it occurs in bands of several to a dozen or more members, though individual pairs drop out to nest. The bands troop through the lower levels of the forest, often with *Tachyphonus delatirii*, following what seem to be regular foraging rounds, subject perhaps to seasonal alteration. The birds fly about rather than flit as they sweep through the branches and vines in their path, actively seeking animal and plant food. Excitable, not noticeably shy, and almost constantly noisy, they become a focus of attraction for many other kinds of birds.

Its cries include a succession of unpleasant, disturbed-sounding, heavy squeaks, something like "skwik squeak squirr," and so on, a metallic, euphonia-like "wrss·wrss·wrss," a metallic "pszz pszz," an unclear hurried "eep·eep·eep·eep," and, especially when flying from one spot to another, a metallic, unclear, rapid "wit·wit·wit·wit."

***Habia rubica* (Vieillot)**

RED-CROWNED ANT TANAGER

RANGE: Mexico to Bolivia and extreme northeastern Argentina.

***Habia rubica alfaroana* (Ridgway)**

RANGE: Northwestern Costa Rica.

***Habia rubica vinacea* (Lawrence)**

RANGE: Pacific slope, southern Costa Rica and Panama.

The Red-crowned Ant Tanager is confined to the Pacific slope. The race *alfaroana* ranges from the Tempisque basin to the lower subtropical belt along the Guanacaste Cordillera, where it may enter a bit into the intermontane gaps. The race *vinacea*, intergrading

with *alfaroana* in the Tempisque region, is distributed from both sides of the Gulf of Nicoya and the Pacific edge of the central plateau south toward Panama. It occurs from the lowlands fairly well into the subtropical belt, but is abundant only in the General-Térraba region, south of which it has not been recorded in Costa Rica.

The species inhabits mostly dry scrubby woods in lowland Guanacaste, virgin and secondary humid woodland in the wetter portions of its range. Usually keeping low in the understory, it hardly ever rises above medium heights in the trees. It is seen for the most part in pairs or family-sized groups the noisiness of which gives the impression of a larger concentration. In the southwest I found it almost invariably moving about in low cover with groups of *Automolus ochrolaemus* at the lower elevations, with the antwren *Myrmotherula schisticolor* at the higher elevations, and from time to time with other kinds of birds in mixed foraging bands. It is attracted to hunting army ants, but is by no means a regular attendant.

Vocally it differs from its Costa Rican congeners in lacking their guttural harsh notes and, at least from *fuscicauda*, in singing unimpressively. It makes a reedy and squeaky chatter or rattle like that of the antwren *Myrmotherula schisticolor* or somewhat like that of the greenlet *Hylophilus ochraceiceps* without the "ernk" quality of the latter; sharp "squick" 's like those of the antwren or of the grosbeak *Cyanocompsa cyanoides*; a scratchy "tchitit" of the sort expected from a very little bird; and heavy "chacking" notes. The rather disagreeable "song" may be given at any time of day. It consists of hardly more than a repetition of the phrase "pee·pee·pee·pee·purp," squeaky as a toy horn and mixed with harsh notes. An equally undistinguished alternate "song" is a halting series of unclear "chyir" 's or "kyür" 's.

***Habia fuscicauda* (Cabanis)**

DUSKY-TAILED ANT TANAGER

RANGE: Eastern Mexico to northern Colombia.

***Habia fuscicauda fuscicauda* (Cabanis)**

RANGE: Nicaragua to northwestern Panama.

The Dusky-tailed Ant Tanager is primarily

distributed the length and width of the Caribbean slope, mostly in the tropical belt and here and there a little above it in the valleys of larger rivers. It overlaps depressions in the northwestern divide, from the Arenal gap northward, where it is common very locally. On the Pacific side there are scattered records from the Tempisque basin in the Tropical Dry Forest to the Río Pirrís in the northern sector of the Tropical Moist Forest. Hence it is partly sympatric with both races of *rubica*.

The species inhabits thickety intermediate secondary vegetation and shaded undergrowth in thinned woodland and heavily foliated cacao plantations, seldom if ever rising above the lower branches of the trees. It may be found in similar habitat a little inside heavy forest. Typically it occurs in small groups, almost never alone. The groups evidently travel about, at least during the non-breeding season, and are quite noisy. The bird forages actively, often with tail spread, mostly for animal food; it is always on the move. Sometimes it is found with army ants, more often not. It is "nervous" and usually very shy.

Its note is a very heavy and harsh scold, like that of a powerful wren, with a throaty buzz or tearing quality: "zzz-zuzzzz-zuzzzz" or "zuh·zur·zur·chitt." Usually repeated a few times, it is given so freely that the bird seems to possess no other utterance. The true song comes as a delightful surprise. Apparently it is given only from April to June and is not heard often. Musical and metronomic like the hurried ticking of a little Swiss clock, often repeated many times, its amusing tick-tock pattern is the result of two recurring "tock's" interpolated regularly between rhythmical "tick's"; it is varied attractively when two half-time notes are substituted for a single long one. Often the song ends unexpectedly on the third note as if the mechanism had broken down. A variation consists of about five "chryoo" 's given alternately up and down. Dashing through the understory, the bird often makes a sharp "pwit," "ick," or "eck."

***Habia atrimaxillaris* (Dwight and Griscom)**

BLACK-CHEEKED ANT TANAGER

RANGE: Lowlands around Golfo Dulce, Costa Rica.

The Black-cheeked Ant Tanager is en-

demic, so far as known, to the Golfo Dulce region in far southwestern Costa Rica. This distinct form was discovered by Austin Paul Smith, who in 1922 collected a series at Puerto Jiménez on the peninsular shore of the gulf. I met it several times near Piedras Blancas on the mainland side and at Rincón de Osa at the head of the gulf. Evidently it is common locally, and perhaps ranges continuously, in the gulf-bordering lowlands; possibly it inhabits the entire Osa Peninsula. On the mainland, however, I did not happen to find it farther south in the Coto district, where it has recently been reported at Corredor by Davis and Davis (1962). It parallels the South American *gutturialis* in having the sexes similarly colored. From *fuscicauda* "it is so different that no comparison is necessary" according to Hellmayr [Cory *et al.*, 1936 (1918-1949), pt. 9, p. 315, footnote]. In Costa Rica it is the only *Habia* in its restricted range, occupying a high-rainfall segment of the southwest skipped over by *rubica*.

Isolated in a lowland pocket with an average annual precipitation of 200-250 inches, the species probably does not occur in nearby, drier Panama. It frequents the shaded understory in advanced second growth, or subforest, merging with tall virgin woods and occurs a little inside broken, selectively logged forest. In general, I found it closer to the ground than the more arboreal *fuscicauda*. I saw it singly and in groups of several, usually lively and noisy, individuals dashing about, coming to sudden stops in foliage, shaking leaf clusters as do heavy-bodied antshrikes, looking around while perched, then dashing off again; also, I saw several together on the ground. The birds appeared to be sedentary at a site. Sometimes they acted shyly, other times not. Though probably animalivorous, this ant tanager was regularly squeezing the juice from small fruits. I did not see it with army ants.

Its scolding, harsh "zurzurzur" and tearing wrenlike note sounded much like the noises of *fuscicauda*. The bird also made a rapid excited chatter that I do not recall hearing from *fuscicauda*, short and weak but resonant "chek" 's or "chuk" 's, and scratchy "tchek" 's while dashing about. I heard no song during my meetings with it in March, July, and August.

Lanio aurantius Lafresnaye

GREAT SHRIKE TANAGER

RANGE: Southern Mexico to western Panama.

Lanio aurantius leucothorax Salvin

RANGE: Southeastern Honduras to eastern Costa Rica.

Lanio aurantius melanopygius

Salvin and Godman

RANGE: Pacific slope of southern Costa Rica and western Panama.

The Caribbean *leucothorax* is known from the approaches to and the slopes of the Cordillera Central from the upper Reventazón Valley to the northwestern side of Poás Volcano, thence onward along the northwestern divide, including an overlap of its Pacific face north of Lake Arenal. It is not recorded from the southeast, where its absence, if real, would be difficult to explain. Vertically, it is fairly common from about the middle of the tropical belt through the lower subtropical belt, and it follows the foothills downward to their junction with the lowlands in the wet-forested northeastern sector. The Pacific *melanopygius* is distributed from the entrance to the Gulf of Nicoya southward into Panama. It is primarily an inhabitant of the tropical belt, ranging upward locally in very small numbers to the lower subtropical belt. It is common in the Térraba region and abundant in the Golfo Dulce lowlands.

The Great Shrike Tanager occurs primarily in heavily forested areas with high rainfall. Sometimes it is found in a thinned opening in woodland, but it does not enter the semi-open, not even beside the forest border. I never happened to see it in flat terrain on either slope, but always along slopes, ridges, and steep valleys in broken country, where the interrupted canopy allows light to reach the lower levels. Though not abundant in individuals, the species is encountered with fair regularity. It occurs singly and in two's or three's, generally from medium heights to high in the trees, also considerably lower at times, almost always with bird parties trooping about noisily and foraging actively. However, at the head of the Golfo Dulce, when accompanied by young in March, it was remarkably sedentary, yet still a nucleus of at-

traction. There I met it for long periods in the same sites daily while other sorts of birds, passing through, joined it temporarily. The male *Lanio* is not only one of the larger and visually the brightest and most conspicuous member of the aggregation, but also the noisiest. In addition to seeking prey in foliage and on limbs, the bird fly-catches and plucks small fruits on the wing.

This is an unusually rich-voiced tanager. Its full-bodied call, or "song," begins with a "see," "stcheee," or "psee," followed with four or so rich "chee" 's successively slightly lower in the scale, then staggers to a close with several additional "chee" 's. It is an arresting call not unlike that of the antbird *Gymnocichla nudiceps* and suggestive of that of the cacique *Cacicus uropygialis*. The bird makes a variable strong chatter similar to that of the antbird *Myrmeciza exsul* and at times to that of the tanager *Chlorothraupis*, sometimes with grosbeak-like mellow "chü-chee" 's mixed in, and a soft chatter which is wrenlike and not unlike that of a euphonia. It also gives a loud "ts tseer" that may be meaningful to other sorts of birds, a continual chipping chatter, a single chipping "tsip," a twitter, and "ss" 's.

***Tachyphonus rufus* (Boddaert)**

BODDAERT'S TANAGER

RANGE: Costa Rica to Peru and north-eastern Argentina.

Boddaert's Tanager, in Costa Rica at the northern limit of its extensive range, seems to have been taken only twice before in the country. Actually it is not rare, and in certain localities it is common. Almost exclusively a Caribbean species, it occurs throughout the eastern lowlands and foothills to subtropical elevations on the approaches to the central highlands and the northern sector of the Talamanca Cordillera. I did not find it, however, in the apparently suitable Río Frío region next to Nicaragua. On the central plateau it is known only from an observation by Charles Lankester on the Caribbean side and one that I made near San Ramón on the Pacific side. The species prefers the semi-open, both in agricultural country and in clearings in forested districts, usually close to dense arborescent second growth, at overgrown roadsides, and in other areas worked over by man. It

often leaves the protection of shrubbery to visit scattered trees.

Quite unlike its two congeners, this tanager neither dwells in woodland nor gathers into bands. It is found almost without exception dispersed in pairs, of which one spirited member is often seen dashing after its mate. As a rule it actively avoids close observation, yet it may unaccountably perch passively on the bare branches of a semi-isolated tree. Generally it is active amid foliated branches from about eye level to medium heights in medium-sized trees. Occasionally it drops to the ground, where the careless observer might mistake the male for an ani.

It is usually silent in contrast to its congeners, but occasionally this open-country *Tachyphonus* delivers a simple song of seed-eater-like musical chirps given alternately up and down. It also makes a weak metallic "sip."

***Tachyphonus luctuosus* Lafresnaye and d'Orbigny**

WHITE-SHOULDERED TANAGER

RANGE: Honduras to Bolivia and Brazil.

***Tachyphonus luctuosus axillaris* (Lawrence)**

RANGE: Southeastern Honduras to north-western Panama.

***Tachyphonus luctuosus nitidissimus* Salvin**

RANGE: Southwestern Costa Rica and adjacent western Panama.

The White-shouldered Tanager is primarily an inhabitant of the humid-forested tropical belt on both slopes, from which it barely rises locally, probably along river valleys, to the lower subtropical belt. The Caribbean *axillaris*, representing the Central American section of the species, is not at all uncommon along the lower, eastern portions of the slope, whence it spreads across, though is not yet reported from, northern Costa Rica to the northwestern divide, where it has been collected at La Bijagua. The Pacific *nitidissimus*, probably belonging to the South American section of the species, reaches its northern limit in Costa Rica as a typical member of the southwestern avifaunal zone; it barely extends into the neighboring, transitional portion of the Tropical Dry Forest formation.

The species is seen along woodland borders and in contiguous light-flecked arboreal second growth much more frequently than in tall forest. It occurs at all levels in the trees, but usually keeps below medium heights. Typically it travels about in small bands, often in the mixed company of greenlets, antwrens, and other tanagers, that sweep noisily and busily through tangled intermediate second growth, and its excited-sounding "tsitting" notes add to the spirit of the assemblage. Extremely active, the birds flit about and in a few moments pass out of sight in the rank vegetation. It thus differs from *rufus*, which occurs in rather sedentary (but active) independent pairs in the semi-open, and from *delatirii*, which occurs in bands in the somber understory of heavy forest. On occasion, when a male is "arguing" or chasing about with another individual, the white bar on the shoulder may take on the appearance of a long welt.

Its voice is poorly developed. The usual calls are a characterless series of about five "tsir" 's, "ts" 's, or "tchrit" 's and a weakly patterned, descending set of three of these notes. A "wrst" like that of the Palm and Crimson-collared Tanagers, a reedy "tsit" or "rick," a hummingbird-like "titting," and a weak "ep" are also given.

***Tachyphonus delatirii* Lafresnaye**

TAWNY-CRESTED TANAGER

RANGE: Nicaragua to western Ecuador.

The Tawny-crested Tanager is confined to the Caribbean slope, mostly in the tropical belt but also locally and in much smaller numbers in the lower subtropical belt. There is no report of its reaching the northwestern divide or the northwestern lowlands. An old record from San Mateo, discussed by Carriker (1910, p. 845), perhaps applies to the Aguacate Mountains as a habitat extension from the lower slopes of Poás Volcano.

A forest species that may wander into adjoining advanced second growth, it is seen invariably in active groups, usually of its own kind, sweeping through the understory. The groups vary in size from a few individuals to bands that spread over half an acre and may include a few other kinds of birds. Often it and another social tanager, Carmiol's, join forces and forage as a unit. When accom-

panied by other birds, it is numerically the dominant species and the one that provides leadership. Its lively passage stimulates other nontrooping birds of the forest to temporarily eager, bold activity.

The species is encountered when its path crosses or coincides with the observer's, but this happens daily in the right habitat. A band usually follows fairly well-established foraging rounds and can be expected regularly at certain sites. When in especially large aggregations, individuals rise from the understory to perhaps 40 feet in the trees. The birds are very active, very noisy, and exhibit a wide range of foraging behavior. They constantly make kissing and sibilant sounds mixed with heavier sharper ones. The call note is a squeaky "chit" or "tswik," sometimes as strong as that of the grosbeak *Cyanocompsa cyanoides*, given singly, doubled, tripled, or in simple repetition.

***Heterospingus rubrifrons* (Lawrence)**

SULPHUR-RUMPED TANAGER

RANGE: Costa Rica and Panama.

The Sulphur-rumped Tanager has not been reported in Costa Rica since the last century. Carriker, who failed to meet it, wrote (1910, p. 853): "This is a very rare bird in Costa Rica, as well as throughout its entire range, very few specimens of it being in existence. All the specimens taken (three in number) were collected along the Reventazón Valley, between 500 and 2,000 feet." Except for Skutch's observation of four birds "in the tree-tops in the forest" on Barro Colorado Island in the Panama Canal Zone (Eisenmann, 1952, p. 56), I have seen nothing published on it in life.

I met this Caribbean species only twice in very humid tropical-belt foothills close to the Panamanian border. Both times a few individuals were mixed with a heterogeneous company, including such gregarious and noisy species as the tanagers *Chlorothraupis*, *Mitrospingus*, and *Tachyphonus delatirii* as well as the cacique *Cacicus*, which was the most prominent member. The Sulphur-rumped Tanager, too, was unmusically clamorous as it uttered a "chickling" or squeaky rapid chatter, warbler-like thin "tsip" 's alone and in twitters, and a Palm-Tanager-like "tsweep." Keeping low in dense

tangled new growth at breaks enclosed by tall forest, it foraged mainly by examining branches in the manner so typical of Palm and Blue Tanagers. Its yellow rump and white breast tufts were as conspicuous in life as in skins.

***Eucometis penicillata* (Spix)**

GRAY-HEADED TANAGER

RANGE: Southern Mexico to Bolivia and Paraguay.

***Eucometis penicillata spodocephala* (Bonaparte)**

RANGE: Pacific slope of Nicaragua and northwestern Costa Rica.

***Eucometis penicillata stictothorax* Berlepsch**

RANGE: Pacific slope of southern Costa Rica and western Panama.

The Gray-headed is one of the few tanagers specifically characteristic of the Pacific slope, where it is distributed the length of the country from the lowlands to lower subtropical elevations. The northern race, *spodocephala*, which inhabits most of Guanacaste Province and the Nicoya Peninsula, is not known on the mainland south of Bebedero in the lowlands or south of the northern sector of the Cordillera de Tilarán along the mountain slopes. It is most abundant at the transition between the tropical and subtropical belts along the Guanacaste Cordillera. Quite unexpectedly I found it on the Caribbean side, in the Río Frío region, where it was common. The race *stictothorax* occurs southward from the entrance to the Gulf of Nicoya, mostly in the tropical belt. It is most abundant in the far southwest, where it rises locally to perhaps 4500 feet, and here its breast streaking is more apparent than elsewhere. Nearly all Costa Rican birds show some streaking below. Many specimens from the northwestern divide are hardly separable from those taken in the southwest.

The species occurs primarily in woodland, both in tangled secondary woods and heavy forests. It keeps to the undergrowth or immediately above it in the understory and also drops to the ground. Rarely does it rise to the crown of a small tree as does an "ordinary" tanager. It may fly along a stream, using it as a highway in the manner of a king-

fisher, or dash through clearings in which it may sometimes stop for a few moments in a small tree or a bush. It is seen regularly in two's, almost as often in small groups, less often alone. It is a "nervous" bird, even at rest, that twitches its tail and flutters or flicks its wings. Though rather shy, it usually reacts positively to squeaking.

In Costa Rica it is a unique tanager in that it habitually follows army ants. (Here the so-called ant tanagers [*Habia*] are not regular attendants.) In fact, it may, except when nesting, be as faithful a follower and as reliable an indicator for the presence of the ants as the antbird *Gymnopithys leucaspis*. Compared with the undergrowth-tied antbirds, however, it is generally much more active as it dashes about in free flights. Yet it may perch quietly, the while flicking its tail, above the ants swarming on the ground or amid the columns trekking up and down the trunks and stems. Its restrained activity now contrasts with that of the tail-flirting antbirds flitting about in the low cover. The bird is also found away from ants.

Vocally this is a specialized tanager. Its usual notes are warbler- and hummingbird-like chips, a very high-pitched, thin and weak "ssn," a nasal short "chk," and a sort of "chup," sometimes repeated deliberately. It makes at least three kinds of calls. One, consisting of three to five squeaky retarded "ss" 's on the same level, is similar to the song of the Caribbean form of the finch *Arremon aurantirostris*. Another is a "tswitting," "spinking," rushing jumble of "spiss" 's and an "ukuk" or two, formless but suggestive of the tanager *Thraupis palmarum*, sometimes shortened and more definite. A more accomplished song, "chitit oooweé wee aweér," is delivered very rapidly, with many more syllables than indicated.

***Mitrospingus cassinii* (Lawrence)**

CASSIN'S TANAGER

RANGE: Costa Rica to western Ecuador.

***Mitrospingus cassinii costaricensis* Todd**

RANGE: Costa Rica and northwestern Panama.

Cassin's Tanager is confined to the Caribbean slope from the northeastern lowlands to Panama; it is probably present in the north-

central and northwestern sectors, where it has not yet been recorded. It is generally common in the tropical belt and most abundant below approximately 1000 feet. It rises into the lower limits of the subtropical belt, so far as known, only in the foothills and valleys that approach the eastern end of the central highlands. Though it inhabits wooded regions and occurs in virgin forest, it is not primarily a forest bird. It is found chiefly along the periphery of forest, in dense thickets and tangled shrubbery overgrowing the borders of forest, and wild low growth in clearings and plantations beside woodland. Inside forest it frequents the same sort of habitat along streams and breaks and at wooded swamps.

Almost without exception it is seen, even during the nesting season, traveling about in pure groups of several to a dozen or more individuals quite unassociated with other kinds of birds. The bands are almost continuously on the move through the low cover and evidently follow established pathways or rounds, except perhaps when wandering to the upper limits of the range. The birds are very noisy and extremely active, constantly jerking their tails and twitching their wings in a highly nervous fashion. They are exceedingly shy and difficult to observe. Occasionally a bird or two may pause in open view in a semi-isolated tree or along a border from 10 to 30 feet above the low vegetation that it habitually frequents.

Its usual note sounds like pebbles bouncing together. Another is a wiry "wss," something like that of *Saltator maximus*. Two longer utterances are a jumble of sharp, somewhat "spinking" and pebbly "spssnk" 's and "sptzk" 's and a weakly patterned outburst of rapid "swiss" 's mixed with pebbly notes.

***Rhodinocichla rosea* (Lesson)**

THRUSH-TANAGER

RANGE: Western Mexico, Costa Rica, Panama, Colombia, and northern Venezuela.

***Rhodinocichla rosea eximia* Ridgway**

RANGE: Southwestern Costa Rica to central Panama.

Until recently, nothing seems to have been published on the living bird in Costa Rica since Carriker wrote in 1910: "This hand-

some species is confined to southwestern Costa Rica, and has been taken as far north only as El General in the upper part of the Térraba Valley. Its range extends from about 800 feet up to 2,000 feet, where it inhabits almost exclusively low scrubby woodland and second-growth scrub, keeping near the ground" (p. 793). "This species is to be found exclusively in the thick second-growth so common about Boruca and Buenos Aires, seeking the most impenetrable parts, where it spends much of its time on or near the ground, climbing and hopping about more after the manner of the larger wrens than anything else. Apparently it is entirely insectivorous. It is almost always seen in pairs (after the breeding season), or a pair of old birds accompanied by one or two young birds of the year. They are very shy, and when approached go skulking off, hopping rapidly from limb to limb or making short flights. The most striking characteristic is the song, which is of the true wren type, having none of the qualities of the warblers and being made up of a series of exquisite trills and whistles, but always with that full, open, liquid quality so characteristic of the tropical wrens" (pp. 331-332). For further remarks see Skutch (1962) and Eisenmann (1962c).

Having had only fleeting glimpses of this bird, I too can testify to its preference for thickety impenetrable growth outside forest at Buenos Aires, Boruca, and near Potrero Grande, all in the Térraba region. In the General basin it is almost if not entirely confined to canebrakes (Skutch, oral communication). The bird was recently reported, without details, whether by sight or sound, from the very wet, far southwestern Coto district by Davis and Davis (1962), where I would not have expected it.

The songs I heard were all four-noted with the above-quoted "full, open, liquid quality" that reminded me of a rich-voiced wren, such as *Thryothorus fasciatoventris*, or the song of an oriole. I made these transcriptions: "wee, choohoo chýo"; "chee chyo, chòyò"; "óh sò chócho." The bird also gives a shorter "chow chow" or "cho cho."

***Chrysothlypis chrysomelas* (Sclater and Salvin)**

BLACK-AND-YELLOW TANAGER

RANGE: Costa Rica and Panama.

Chrysothlypis chrysomelas chrysomelas
(Sclater and Salvin)

RANGE: Costa Rica and western Panama.

The Black-and-yellow Tanager is an uncommon Caribbean species previously recorded from five localities. I found it at one of these and at three others. It is restricted to a very wet, partly cloud-forested foothill zone at upper tropical and subtropical elevations extending from the low crest of the northwestern divide, just south of Lake Arenal, to the northern and eastern sides of the Cordillera Central and the approaches to the Talamancan Cordillera southward to Panama. This distribution may or may not be interrupted locally in areas with reduced precipitation. In my experience the center of abundance of the species follows the 3000-foot mark, dipping to lower elevations where equivalent climatic conditions accompany the rapid fall of steep slopes. I have seen this tanager at precisely the same places in the zone as other indicator species, such as the flycatcher *Phylloscartes supercilii* and the tanager *Buthraupis arcaei*.

The bird is found in heavily wooded country, especially along breaks, cuts, and forest borders, from which it strays a bit to semi-isolated trees in adjacent openings. Usually it keeps fairly well up in the trees, sometimes very high. Occurring in active small bands that seem to wander about, the bright males draw the observer's eye away from the plain females. It engages in flycatcher- or redstart-like, insect-catching sorties; otherwise it forages in foliage as do small arboreal tanagers and vireos. In life it appears warbler-like, and the bill in both sexes is black, sharp, pointed, and seems to be slightly upturned. The only sound I heard was a characterless "tsiss."

Chlorospingus ophthalmicus (Du Bus)

COMMON CHLOROSPINGUS

RANGE: Southern Mexico to Bolivia and northwestern Argentina.

Chlorospingus ophthalmicus regionalis Bangs

RANGE: Nicaragua to eastern Costa Rica.

Chlorospingus ophthalmicus novicius Bangs

RANGE: Southwestern Costa Rica and adjacent western Panama.

This chlorospingus is one of the common birds of the cool and wet interior highlands, from the northwestern divide through the central highlands, especially their Caribbean versant, to the Dota region and the length of the Talamancan Cordillera on the Pacific slope but, so far as known, only to its north-eastern approach on the Caribbean slope. Vertically the species ranges from about the middle of the subtropical belt (locally from its lower limits) abundantly upward into the lower montane belt, mostly under cloud-forest conditions. It inhabits wooded regions for the most part, but visits open country covered by new low growth interspersed with thickets, shrubs, and trees, as on the mountain slopes that overlook the central plateau.

It is usually seen in small bands traveling about in company with other birds or not, generally from eye level to 30 feet up. Often foraging low, the birds might suggest a flock of sparrows in undergrowth. They flutter and flit as actively as warblers, then often tumble to a lower branch. They do not habitually peer at branches and leaves, as do a number of other tanagers. I have seen this chlorospingus also chewing flowers. The wings flick continually and constantly flash their white under sides.

The birds are noisy and make a variety of unmusical notes and calls. A "tsip" or "tsit" is given alone or in series, at intervals or in rapid succession, in twitters or as a prolonged clipping rattle not unlike that of the warbler *Basileuterus tristriatus*. A sharp penetrating "tsick" is also given alone or in excited-sounding series. A burred "pzt," similar to that of the calliste *Tangara icterocephala*, sounding buzzy or sibilant or both at the same time, may be heard from all sides. Typical of the species is a snorting, extremely rapid and descending "tsitting" trill, like that of a hummingbird.

Chlorospingus pileatus Salvin

SOOTY-CAPPED CHLOROSPINGUS

RANGE: Costa Rica and western Panama.

Chlorospingus pileatus pileatus Salvin

RANGE: Costa Rica and adjacent western Panama.

The Sooty-capped *Chlorospingus* is one of the very common high-altitude birds. It is especially abundant in the montane belt downward from timber line, becoming scarce below the upper portion of the lower montane belt and rare at the upper limits of the subtropical belt. Since it lives on the crests in the central highlands, the Dota region, and along the Talamanca Cordillera, it occurs on both the Caribbean- and Pacific-facing slopes. In addition, I found it quite uncommon at 5600 feet on the rainy crest of the Cordillera de Tilarán, a northern extension of its previously known range.

The species frequents forested ridges and breaks, woodland borders, and shaded park-like pastures, at all heights in the trees. Generally it is seen in active groups trooping through the vegetation, often noisily tearing curled dead leaves. It may be as tame and confiding as a chickadee, which it resembles somewhat in behavior and in general appearance and style of plumage. The members of a group evidently keep in contact by means of their rapid squeaky twitters and other penetrating thin notes. The bird also makes scratchy sounds, a hard ripple, and a sort of "spinking."

***Chlorospingus zeledoni* Ridgway**

ZELEDÓN'S CHLOROSPINGUS

RANGE: Costa Rica.

The high-altitude Zeledón's *Chlorospingus* is known thus far only from the Irazú-Turrialba massif. It is virtually confined within the montane belt up to timber line, though it has also been recorded lower on the slope that overlooks the upper Reventazón Valley. It is completely sympatric with its far more abundant sibling, *pileatus*. I have seen both species trooping through the same places within a few minutes of each other. Possibly they occur together, but I did not happen to observe them in the same band. At any rate, I noted Zeledón's very infrequently, perhaps in part because of its great resemblance to *pileatus*. For the same reason I never definitely identified its voice. Unlike *pileatus*, it is seen alone and in two's as well as in small groups. However, I was unable to distinguish differences in foraging behavior or habitat. Both species

have been found in breeding condition at the same time of year in the same place.

***Chlorospingus canigularis* (Lafresnaye)**

ASHY-THROATED CHLOROSPINGUS

RANGE: Costa Rica; Colombia to northwestern Venezuela and northwestern Peru.

***Chlorospingus canigularis olivaceiceps*
Underwood**

RANGE: Costa Rica.

The seldom-seen Ashy-throated *Chlorospingus* is represented in Central America by a population endemic to central Costa Rica. It may or may not be specifically distinct from the dusky-capped populations in South America. In Costa Rica it is known from a handful of localities rather closely grouped on the Caribbean slope, from the region of the Reventazón Valley at lower subtropical elevations to the lower northern slope on the eastern sector of the Cordillera Central. I suspect this limited narrow range extends northwestward along the continental divide, probably to Lake Arenal, and southward along the Talamanca Cordillera, if only because the confinement of the bird to very wet parts of the forested subtropical belt is similar to that of the flycatcher *Phylloscartes* and the tanagers *Buthraupis* and *Chrysothlypis*. I met it at only two places, both in cool and wet virgin forest, where it ranged from the canopy down to about medium heights or a little lower at openings. It occurred in small active flocks that were evidently traveling about. The only sound that I could definitely assign to it was a sort of "tsirt-tsirt."

The four members of the genus *Chlorospingus* in Costa Rica separate into two groups of paired species, in each of which one is very common and the other scarce. The abundant and widespread *pileatus* and the very uncommon and local *zeledoni* are sympatric at high altitudes; they seem to be alike in habit and habitat. The abundant and widespread *ophthalmicus* and the scarce and local *canigularis* are sympatric in the lower middle altitudes: *ophthalmicus* keeps to the lower levels, seldom rises into the middle forest, and is not restricted to heavy forest; *canigularis* seems to be restricted to heavy forest, where it fre-

quents the canopy and does not usually appear to descend below medium heights.

FAMILY **FRINGILLIDAE**

Saltator atriceps (Lesson)

BLACK-HEADED SALTATOR

RANGE: Mexico to Panama.

Saltator atriceps lacertosus Bangs

RANGE: Costa Rica to central Panama.

The Black-headed Saltator is a widespread Caribbean species common in the lowlands and rising well into the subtropical belt on the foothills and slopes that lead to the central highlands; it has not been reported from the northwestern divide. There is a record for the Caribbean side of the central plateau; another for San José, on the Pacific side, is very unusual. In common with other Costa Rican saltators, it avoids the interior of heavy woodland, but finds an ideal environment along forest borders, in shaded plantations, high tangles and thickets, and second growth mixed with shade trees.

It often occurs in animated small groups that move about from site to site, usually below medium heights in the trees, often at shrub height. Its abundance, large size, and noisiness make it one of the most conspicuous birds, yet it is not always easy to see because it seeks concealment and is hard to approach. Should it happen to light in open view, it immediately moves into denser foliage. Aside from its larger size and the color of its crown and throat, it is virtually identical to the sympatric *maximus* in appearance, though its voice is completely different. In size and shape both species might bring a robin (*Turdus*) to mind. Moreover, they (as well as *coerulescens* and *albicollis*) exhibit the robin-like mannerism of settling stiffly on a perch and then twitching the tail. Their hurtling flight is robin-like, too. Both species are gregarious with their own kind and also mingle freely with other birds.

The rough voice of the Black-headed Saltator, identifiable from a single note, is unique among Costa Rican finches and tanagers, yet difficult to describe. The raucous call is compounded of fowl and parrot: "uh cackle cackle, wheeep." The cackling portion descends, and the long "wheeep," coarse but with a penetrating sharpness, rises in a curve.

The usual single note is parrot-like, and the bird makes a parrot-like rattle. In flight the bird sometimes delivers a jerky "ock·ock·ock·tchrip·tchrip·tchrip·ock." When, say, three birds call together, only one gives the regular call; the others join in with "uh-uh-uh-uh-uh" 's that underline the final "wheeep."

Saltator maximus (Müller)

BUFF-THROATED SALTATOR

RANGE: Southern Mexico to Bolivia and southeastern Brazil.

Saltator maximus magnoides Lafresnaye

RANGE: Southern Mexico to northwestern Costa Rica and northwestern Panama.

Saltator maximus intermedius Lawrence

RANGE: Southwestern Costa Rica to central Panama.

The Buff-throated Saltator ranges mostly in the humid life zones from coast to coast and to altitudes well above those of the central plateau, even toward the upper limits of the lower montane belt in some places in the central highlands. Above 3000 feet or so it is irregular, but at lower elevations it is one of the most common birds of the country with the exception of the subhumid Pacific northwest, from which it is absent north of the lower Tempisque drainage. Its habitat includes woodland borders, tall thickets, plantations with shade trees, and second growth. In general it prefers an environment halfway in character between the semi-open and woodland, and is usually seen in medium-sized trees and tall shrubbery. It does not inhabit the deep forest, although individuals are sometimes met fairly well behind the border.

The species associates in loose groups of independent members that do not, however, troop about as a unit. This gregarious tendency seems better marked in *magnoides* of the Caribbean and northern Pacific slopes than in the southwestern *intermedius*. It would appear that a number of individuals sharing the same amenable situations are perhaps stimulated by each other's company. As with the other saltators its restlessness and wariness often make it a hard bird to see. Habitually it

withdraws behind leaves and utters its musical calls with exasperating frequency when screened from sight. It is perhaps the most active of the saltators and the only one that I have seen attracted to legionary ants. Joining the festivity, it selects choice prey, driven out of concealment, by fluttering, sallying, and darting as well as by bark and crevice searchings and creepings. Possibly a variety of tastes and the means to satisfy them account for the indubitable success of the species.

This saltator makes a number of cries, some of them musical, almost all recognizable. Its usual note is a high, thin and weak, sibilant, robin-like "sink" or "sst," hissed or whistled through figuratively clenched teeth, or a constantly repeated scratchy "tsnt." The "song" is a musical three- or four-syllable, robin-like or vireo-like phrase. In the highlands I heard an entirely different two-part song, neither loud nor forceful yet rich, deep, and mellow, in quality similar to that of the peppershrike *Cyclarhis gujanensis*, the grosbeak *Pheucticus chrysopheplus*, or the wren *Henicorhina leucophrys*. In the southwest I heard an odd cry consisting of a metallic note running into a few throaty hoarse ones. Another call is an unmusical "cherry-cherry" (or "churry-churry") much like that of the shrike-vireo *Smaragdolanus pulchellus*. Another sound is a hummingbird-like rapid ticking given when one aroused individual is being chased by another.

***Saltator coerulescens* Vieillot**

GRAYISH SALTATOR

RANGE: Mexico to Costa Rica, and from northwestern South America to Bolivia and northern Argentina.

***Saltator coerulescens grandis* (W. Deppe)**

RANGE: Southern Mexico to central Costa Rica.

The Grayish Saltator has a limited and unusual Costa Rican distribution, probably because it is inadequately known. One center of common occurrence is the central plateau, from which some of the birds rise part way up the neighboring mountain slopes. Others not uncommonly lap over the Caribbean edge of the plateau down to the lower limit of the subtropical belt, very sparsely lower to 1500 feet, in the Reventazón drainage. The species is

found again, uncommonly, in the dry-forested Pacific lowlands at the head and along both sides of the Gulf of Nicoya. This population, named *brevicaudus* by van Rossem (1931, p. 22), in which I barely recognize a weak tendency to shorter tail length, shown only in some individuals, is more or less continuous with the one on the central plateau. A third, isolated concentration is in the Río Frío region, where I found it abundant. These birds would belong to the southern Nicaraguan population encountered by Richmond (1893, p. 491) at nearby San Carlos, Lake Nicaragua. Also, I have a single observation in the northeastern, Sarapiquí lowlands of a wandering individual, but from which direction it came I cannot guess.

The usual habitat is open country dotted with small trees and bushes, brushy fields, boundaries of agricultural lands, plantations, and parklike areas. In general, this species prefers a more open environment, barely extending into the edges of woodland, than do the other saltators. Again unlike its congeneric neighbors, *maximus* and *atriceps*, it is not gregarious; not more than a pair are apt to be met at any one time. Except for an occasional selected locality, as to the south of the city of Cartago and at the Río Frío, it is not common. Yet it is the only saltator that enters well into towns; it sings freely in the city of San José. The observer, finding it much harder to see closely, will probably agree that the Grayish is warier than the saltators with which it is sympatric.

Its voice is not so musical as that of *maximus* and *albicollis* but more interesting, and it features locally fixed variations. The full song sounds like "cheéyur, peep peepee péé work," often with the first note omitted, or "yo, soy, pa, papagáyohh," with its finish chanted as in Mexican rural speech. Another call of short sharp notes, "pee poo, peepee poo," is not unlike the "spinking" sounds of the oriole *Icterus mesomelas*. A strongly patterned phrase, which I have heard only on the central plateau, consists of two double-syllable mellow notes and a concluding single note: "weèhoo weèhoo hoo." Only at Río Frío did I hear a four-note song, "chee, chee-chee chweee," with the last note rising, if it were diagramed, in an arc, which strongly resembles that of the allopatric *albicollis*.

***Saltator albicollis* Vieillot**

STREAKED SALTATOR

RANGE: Costa Rica to Peru and Venezuela; Lesser Antilles.

Saltator albicollis furax

Bangs and Penard

RANGE: Southwestern Costa Rica and adjacent western Panama.

The Streaked Saltator is confined to the Pacific southwest, so far as known, only from the General region to Panama. Vertically it ranges primarily in the upper tropical and lower subtropical belts; locally it is still fairly common at 3500–4500 feet. Living almost exclusively in brushy pastures with small trees, in bordering high thickets, and at the edges of woodland, it seeks the concealment of dry thickets, small-leaved bushes and low trees, and viny tangles rather than the shaded broad-leaved foliage in a lofty grove. It barely enters heavy woods but is apt to occur in clearings amid forest in the Térraba region. The few birds that I saw in the heavily wet-forested lowlands of the Coto district near the Golfo Dulce I consider to be out of the true ecological range.

It most resembles *coerulescens* in choice of habitat and in occurring usually alone or in two's, at most in three's. The lack of concentrations probably indicates wariness and a solitary disposition, because the bird is by no means uncommon; as a rule it is very shy, except when singing from an exposed perch. Like the other saltators, it seems never to go to the ground, though I found it roosting very low in reedy shrubbery. In its foraging it shows the usual generic preference for fruits and buds over animal prey.

The full song is a measured, fine and mellow "tchroo, tchyew tchyew tchyew tchweé," with the upsliding inquiring final note giving it special character. Often, however, only the last three syllables are given, once or in repetition. The pattern is much like that of *atriceps*, but the quality is of course completely different. The bird also makes a soft "churr," a robin-like "ak·ak·ak" and a grosbeak-like hard chip.

***Caryothraustes poliogaster* (Du Bus)**

BISHOP GROSBEAK

RANGE: Mexico to Panama.

***Caryothraustes poliogaster scapularis* (Ridgway)**

RANGE: Honduras to central Panama.

Strictly a Caribbean species, the Bishop Grosbeak is distributed the length and width of the tropical belt. It rises commonly but in smaller numbers into the lower subtropical belt on the approaches to the central highlands, probably also along the Talamanca Cordillera. A report from La Bijagua on the Caribbean side of the Guanacaste Cordillera is the only one for the northwestern divide. A forest-inhabiting bird that frequents the canopy and upper strata, it regularly enters the neighboring semi-open at all heights in the trees. I was surprised at its abundance in the scrubby Río Frío region.

Almost without exception throughout the year, including the breeding season, it is seen in variously sized, active, noisy groups of several to 20 or 30 individuals trooping about inside and outside forest, often accompanied by a variety of temporarily associated, usually smaller-sized birds. In the subtropical portion of its range I noticed time after time that it and flock-sized aggregations of the woodhewer *Xiphorhynchus erythropygius* traveled about together as an integrated band. This grosbeak flutters off leaves and searches mossy branches for grubs, caterpillars, and undoubtedly many other kinds of prey. It takes fruits, and I have seen it extract juice from a berry in the manner of a manakin or a chlorophonia.

The bird can be identified at a distance by its sharp short "pwtst," usually followed by a "chirp·chirp·chirp," given almost constantly; either cry may be given alone. Other single notes are a "pt," a low "whrt," and a "ch·weést." Its song is a musical agreeable "churtweét churtweét churtweétcha" delivered leisurely as in the tanager *Phlogothraupis*. It also varies to a deliberate "aweétsya aweétsya," often followed by a weaker, higher-pitched "teewee" in the style of the Yellow Grosbeak.

***Pitylus grossus* (Linnaeus)**

SLATE-COLORED GROSBEAK

RANGE: Nicaragua to Bolivia and Mato Grosso.

***Pitylus grossus saturatus* Todd**

RANGE: Nicaragua to western Ecuador.

The Slate-colored Grosbeak is confined to the Caribbean slope where its known distribution, from the northeastern lowlands to Panama and locally the lower subtropical belt along the northern and eastern slopes of the central highlands, is virtually identical with that of *Caryothraustes*. It has not yet been recorded, however, westward in the north-central and northwestern sectors. It is common only in the very humid low foothills and contiguous lowlands on the northeastern approach to the Cordillera Central.

A true forest bird, it keeps high in the trees. From time to time it barely leaves the forest border to visit fruit-bearing trees and palms in the neighboring semi-open; here it keeps at all heights and occasionally drops to the ground. It is rather sedentary and nongregarious, occurring singly or at most in pairs. Though heard often, sometimes almost endlessly, it sings from a stationary position in high branches and is difficult to see. Its highly variable, rich, mellow song, bringing to mind that of a fine-singing grosbeak, wren, or oriole, consists of one or two two-part phrases, questioning or not. Also given are a very sharp clipping chip and a catlike meow of the sort made by several other unrelated birds.

***Pheucticus chrysopheplus* (Vigors)**

YELLOW GROSBEEK

RANGE: Northwestern Mexico to Guatemala; Costa Rica and western Panama; northwestern South America.

***Pheucticus chrysopheplus tibialis* Lawrence**

RANGE: Costa Rica and western Panama.

The Yellow Grosbeak is known almost exclusively from the mountainous central part of the country, including the Dota region. It occurs not uncommonly from timber line down through the lower montane belt and is met from time to time in the subtropical belt along the Caribbean versant of the central highlands and the slopes that face the central plateau. It seems to be most common in the upper middle altitudes. In addition, I found it several times at two places along the Cordillera de Tilarán, in one of which at the end of June the bird was singing cheerfully amid miserably chilly dripping surroundings on the mist-driven crest. Surprisingly, I saw several

individuals regularly in the northeastern lowlands during December and January. The species probably occurs along the Talamanca Cordillera, from which there is not a single report.

Its distribution coincides with the presence of forest, but the bird prefers the forest borders, cutover breaks, and tree-scattered pastures under high-rainfall or cloud-forest conditions. It is seen seldom inside forest. It occurs singly, in two's, and in three's or four's at all heights in the trees. It sings usually from a high perch, but at other times may descend much lower. Often, even when singing, it is not seen until it flies, when it appears patterned like an oriole with a white wing patch. Perched, its wings and tail appear to be black, except for a white spot at the edge of the wing. A slow-acting bird, it apparently feeds mostly on berries.

The good rich song sounds like a somewhat jerky mixture of robin and Grayish Saltator, with an underlying grate at close range, finished off with a suddenly higher-pitched string of up to 10 "wee" 's or "choo" 's in the style of the blackbird *Agelaius phoeniceus* or the wren *Thryothorus atrogularis*. It reminds me also of the Blue-black Grosbeak and a slow-singing canary. The call note is a metallic reedy "kip" or "pwik." I have also heard a "chickuk" similar to that of the tanager *Piranga rubra*.

***Pheucticus ludovicianus* (Linnaeus)**

ROSE-BREADED GROSBEEK

RANGE: Breeds in eastern North America; winters from Mexico to Ecuador and Venezuela.

The Rose-breasted Grosbeak is a fairly common transient and an uncommon visitant. Though recorded as early as mid-August and in September, it is primarily an October migrant. In the spring it returns northward from the latter part of March through April. A June record had best be disregarded as a probable escape. During migration it is apt to occur anywhere along both slopes, from the lowlands through the subtropical belt, including the central plateau.

In winter it is present in small numbers over the plateau region, along the subtropical Caribbean slope, especially Cartago Province, and in the tropical and subtropical belts

the length of the Pacific slope; it evidently avoids the lower elevations on the humid Caribbean side. It does not enter well into heavy forest, but occurs along the borders of forest, usually in broken terrain. It is generally seen in small groups from shrub height to well up in the trees. The birds are active and fly about from site to site rather than work their way methodically through the trees. The notes are a metallic "chik" or "chink" and a gentle mew.

***Guiraca caerulea* (Linnaeus)**

BLUE GROSBEAK

RANGE: Breeds from southern United States to Costa Rica; northern birds winter to Panama.

***Guiraca caerulea caerulea* (Linnaeus)**

RANGE: Breeds in southeastern United States; winters from southern Mexico to Panama.

***Guiraca caerulea lazula* (Lesson)**

RANGE: El Salvador to northwestern Costa Rica.

The resident *lazula* inhabits the Tropical Dry Forest from both sides of the Gulf of Nicoya to northern Guanacaste, rises into the Subtropical Moist and somewhat into the Subtropical Wet life zones along the Guanacaste Cordillera, and reaches the western portion of the subtropical central plateau. Seen singly for the most part but seldom encountered, apparently dispersed locally, it is least uncommon along the lower slopes of the northwestern divide. There, too, during the breeding season, I have seen trios in which two males were chasing each other, with a female leading the way. The northern *caerulea* apparently migrates mostly along the Pacific slope and across the plateau region. It is occasional on the Caribbean slope in the lower subtropical belt and has been found once (A.M.N.H. No. 514012) in the lowlands (Boca Matina, February 22, 1894). In winter it is almost entirely sympatric with the resident *lazula* in the northwestern quadrant of the country. The supposed specimens of *interfusa* Dwight and Griscom, recorded from Costa Rica in the check-list of the American Ornithologists' Union (1957),

"are identical with *G. c. caerulea*" (A. Wetmore, personal letter).

Both the migrant *caerulea*, which is generally seen in small groups, and the normally solitary, native *lazula* prefer the drier to the wetter areas and frequent similar habitat, such as tree-scattered clearings with dense ground cover, pastures with bushes, thickety borders, and temporarily abandoned agricultural lands. Usually they keep to the low cover, occasionally dropping to the ground, in the same sorts of situation in which to expect wintering Indigo Buntings. A breeding bird, however, may rise well up in medium-sized trees. A courted female up in a tree may keep her crown feathers semi-erected, thus appearing flat-foreheaded and with a shaggy occipital crest. This grosbeak sidles rapidly along a branch, like a parrot, or moves forward in a hopping walk. It hops on the ground, where the bright male seems incongruously out of place, gleaning seeds and making fly-catching flutters. It makes buzzy sounds, guttural and burred, swallow-like "djirr" 's, and metallic, sharp "chit" 's, "pirt" 's, or "ptink" 's. I did not hear the song.

***Cyanocompsa cyanoides* (Lafresnaye)**

BLUE-BLACK GROSBEAK

RANGE: Southern Mexico to Bolivia and Mato Grosso.

***Cyanocompsa cyanoides caeruleus* Todd**

RANGE: Honduras to western Panama.

The Blue-black Grosbeak, one of the common birds of Costa Rica, most abundant at the lower elevations, is widely distributed from both coasts well into the subtropical belt, but is absent from the entire region of the largely deforested central plateau and from the Tropical Dry Forest north of the lower Tempisque Valley. Though primarily a humid-forest species, it occurs very commonly along edges and in second growth and visits small stands of trees or semi-isolated ones in the semi-open, when it rises to medium heights; I even found it in mangroves. Of the several grosbeaks in the country, it is the only one that occurs habitually not more than a few yards or a few feet from the floor in the shadowy forest understory.

It is seen as a rule in pairs the members of

which are either close together or temporarily separated during the search for food. When disturbed it makes the same sort of sharp chipping and nervous side-to-side shifting of the hindquarters, accompanied by a lowering and accented raising of the tail in diagonal sweeping arcs, as its undergrowth-inhabiting woodland neighbor, the Orange-billed Finch. Unlike the Orange-billed, it keeps a little higher in the lower understory, is not at all terrestrial, and moves about actively instead of being relatively sedentary. Pairs usually show a preference for a certain part of the forest or for a brushy clearing within the forest. In the semi-open, where the species sometimes nests, an individual may keep returning to a particular tree. The bird takes plant and animal food, and I have seen it fluttering persistently in front of a web before successfully snatching a large spider. Often twitching while clinging to a vertical perch, such as a herbaceous stem, it may bring to mind a semiterrestrial antbird.

The bird makes a very sharp, often identifiable "djit," perhaps repeated a few times, and a sharp "tswick" or "wick" (in the southwest, more like a reedy "tchek") that may characteristically be doubled to "skwikik" or "skwik·skwik." A squeaky "kawoink kawoink kawoink," of which the "oink" is not unlike that of the antwren *Myrmotherula schisticolor*, the greenlet *Hylophilus ochraceiceps*, and the woodhewer *Dendrocolaptes certhia*, may be mixed with "tsink" 's or "tsik" 's. An odd rattle is also given. The good mellow song is a typical woodland sound heard most of the year. It begins with four successively descending whistles rapidly followed by an accented note, several staccato notes, and a long terminal note; often it is not given in full. Apparently both sexes sing.

***Passerina cyanea* (Linnaeus)**

INDIGO BUNTING

RANGE: Breeds in eastern North America; winters chiefly from Mexico to central Panama, also in West Indies; recorded in Colombia and Venezuela.

The Indigo Bunting is not known to arrive before October and remains ordinarily until the latter part of April. An exceptional record is that of "a male in changing, brown-

blotched plumage, collected at Limón, Costa Rica, June 11" (Blake, 1958, p. 570). During migration it occurs along both slopes, much more commonly the Pacific than the Caribbean. In winter it is found primarily on the Pacific side and the central plateau, occasionally on the Caribbean side. It is met in largest numbers in the southwest, mostly in the upper tropical belt, and with fair regularity in the dry-forested lowlands in the northwest.

The bird prefers "field" habitats, that is, open-country scrub, grassy and bushy pastures, abandoned agricultural lands, and low thickety edges. Usually it occurs in small flocks, close to or on the ground, that wander about perhaps within a circumscribed area or probably over longer distances. On the Caribbean side during the winter, at any rate, a small group may briefly reappear a few times in an area with suitable habitat, even in heavily forested regions, as do wandering groups of the Myrtle Warbler (*Dendroica coronata*), for example. The birds are mostly female-plumaged, usually with a blue individual or two or several with a touch of blue. The only sound that I have heard is a sharp little "pit" or "tsip."

***Passerina ciris* (Linnaeus)**

NONPAREIL

RANGE: Breeds in southern United States and northern Mexico; winters south to Panama, also in Bahamas and Cuba.

***Passerina ciris pallidior* Mearns**

RANGE: Breeds in southwestern United States and northern Mexico; winters from Mexico to Panama.

The Nonpareil, or Painted Bunting, is exceptional in that the western race winters to southern Central America, rather than the eastern race. In Costa Rica it is known almost exclusively as an uncommon visitant, small in total numbers, seen only occasionally from November to March, though probably it arrives considerably earlier and departs later. All records apply to the Pacific slope, with two centers of distribution in the winter: the Pacific northwest and the far southwest. Possibly the intervening gap is more apparent than real. In the northwest the species mostly inhabits the Tropical Dry Forest, from which it barely rises upon the lower slopes of the

Guanacaste Cordillera and rarely spreads to the central plateau and its facing slopes. In the southwest it is known only from the Téraba-Coto Brus region, primarily in the upper tropical belt, where it is very local. The bird evidently prefers the shade provided by woodland, even in the generally scrubby northwest. It is most often encountered in thickety or scrubby undergrowth in rather open woods or at the side of a stream, but it may forage high in the trees in the manner of a warbler or vireo. It is seen singly, as a rule, also in small groups.

Tiaris olivacea (Linnaeus)

YELLOW-FACED GRASSQUIT

RANGE: Mexico to Colombia and Venezuela; Greater Antilles.

Tiaris olivacea pusilla Swainson

RANGE: Mexico to Colombia and Venezuela.

In Costa Rica this grassquit seems originally to have been an inhabitant of the middle altitudes. It is abundant over the entire subtropical plateau region, from which it rises well into the lower montane belt on the neighboring slopes, extends northwestward along the continental divide at least as far as Miravalles, and spreads eastward down the Caribbean versant, commonly in the subtropical belt and here and there to the coastal plain. It has not been found in the apparently suitable Río Frío region. It occurs again at subtropical elevations that front the Talamanca Cordillera in the far southwest (possibly also in the southeast, as I found it at three localities in the Sixaola region), but only at Dominical, on the coast, did I find it below the upper tropical belt. Otherwise it is entirely absent from the Pacific lowlands the length of the country.

An open-country species, it inhabits fields, plantations, pastures, clearings, roadsides, and deforested areas generally. It is uncommon to rare even in suitable habitat in extensively forested regions. In favorable situations it is usually seen in small groups or larger bands, though also spread about in one's and two's; where scarce it is met singly at highly irregular intervals. As a rule it stays low in weedy and bushy growth, clinging to seed-bearing grass stems, and it regularly

forages on the ground. It is also apt to occur, particularly where rare, in dense shrubbery and the lower leafy branches of trees, acting like a vireo or a warbler or a small tanager. Resembling a wren rather than a "sparrow" on the wing, it features an even wing fluttering and a slow nondipping flight of short duration. Its commonly given call is an insect-like twitter, "tstststststs," and so on, on one level. The only other sound I have heard is a thin "tsint·tsint."

Spiza americana (Gmelin)

DICKCISSEL

RANGE: Breeds in central North America; winters chiefly in northern South America.

On its breeding grounds in the north, the Dickcissel wears its attractive nuptial dress, sings a weak little song of sorts, and destroys large quantities of injurious insects. It is a pleasant little bird which, keeping close to the ground, resembles a little meadowlark. In Costa Rica the species is regarded very differently. Its bright plumage is dulled. It no longer sings but makes guttural and harsh noises that sound ominous, because there its feeding habits convert the migrant Dickcissel into the supreme pest of the rice fields. It arrives like a plague from foreign parts as the rice ripens. Soon, by early September, the flocks have grown into clouds, and the depredations continue through the harvests in October and November. The birds are unusually wary, no doubt because of the human disturbances to which the pestilential flocks are subjected continuously. The great mass of individuals is concentrated in the lower Pacific northwest, especially where rice is cultivated in greatest quantity westward from the central plateau. Smaller numbers of birds appear mysteriously at almost any place in the country where rice has been planted. The species migrates along the Caribbean slope, too, through October and possibly into November, in relatively very small numbers.

From December to April the species diminishes enormously. The few winter records are mostly from the Pacific northwest, and I found single individuals regularly during January on the southwestern savannas. Possibly the flocks dissipate in search of other kinds of foods. Probably most of the

birds pass onward to the main wintering grounds in northern South America. The return migration along both slopes in the spring is hardly noticeable. Transients are seen in March and, especially, the entire month of April. I know of no May records; one for June is probably of no significance.

As usually seen (during the fall migration), the bird perches in trees, dropping to the ground only to feed on rice or other grains. A single individual easily escapes detection. A tree harboring a flock, however, is alive with movement and noise. The notes include a buzzy "tzrr-tzrr-tzrr" and a single piglike or tityra-like "krik" or "gzit." A ceaseless twittering and the fluttering sound of innumerable wings accompany the birds when in flocks.

***Sporophila schistacea* (Lawrence)**

SLATE-COLORED SEEDEATER

RANGE: Costa Rica to western Ecuador, Bolivia, and northeastern Brazil; (southern Mexico [Oaxaca]?).

***Sporophila schistacea crissalis* Carriker**

RANGE: Southwestern Costa Rica and adjacent western Panama.

The Slate-colored Seedeater, in Costa Rica at its northern geographic limit (except for a form described provisionally by Berlioz [1959] from southern Mexico), is confined to the southwest. There, so far as known, it is sharply restricted to the upper Térraba Valley. In fact, it has been recorded only from the general neighborhood of Buenos Aires and Boruca, the only places at which I met it, too, but there it is abundant. Though its distribution in part follows the savannas, the bird does not frequent them. Unlike its Costa Rican congeners it does not even visit the semi-open.

I found it only in thickety growth bordering woodland and in the dense understory at breaks, openings, and cuts in woodland, not at all inside forest. Hence it feeds not on the small seeds of grasses but on the larger ones produced by certain kinds of thickety growth. In appearance, too, this seedeater differs from the other, contrastingly patterned forms of *Sporophila*. Plain-colored, it offers two field marks to the observer and perhaps to individuals of its own kind: a conspicuous yellowish straw-colored beak and a white spot half-

way down the edge of the wing. I met it only in groups which, in twittering assembly, kept hidden at low levels in the thickety, viny cover.

Vocally this *Sporophila* is distinctive, too. Following a sort of whistled intake of breath, it makes a level, warbler-like trill of metallic "tsit" 's succeeded by a similar trill on a lower level. The introductory note and the first trill may bring to mind a phrase of a nightingale thrush (*Catharus*) or the North American Hermit Thrush (*Hylocichla guttata*). With the addition of its other trills and metallic whistles the song might be likened to the elaborate long warble of a canary. The bird also makes very thin "tsnt" 's and rather deliberate "tsit" 's that alternate in a long series, a sort of chip, and a set of two or three squeaky notes. From time to time a flock erupts in an odd, piercing "twissing" twitter.

***Sporophila torqueola* (Bonaparte)**

WHITE-COLLARED SEEDEATER

RANGE: Southern Texas to northwestern Panama.

***Sporophila torqueola moreletii* (Bonaparte)**

RANGE: Southern Mexico to northwestern Panama.

The White-collared is easily the most widespread form of seedeater in the country. Distributed from both coasts to lower-montane elevations in the central highlands, it is extensively sympatric with both races of *S. aurita*. It is common on the central plateau, where it is the only member of its genus present. On the Caribbean slope, including overlap onto the Pacific face of the northwestern divide, it occurs with *S. a. corvina*. It is, however, rare or lacking in suitable habitat in extensively forested regions, as in the northeastern lowlands. Oddly, it seems to be missing from the open Río Frío region, in which *corvina* is abundant. On the Pacific slope it outnumbers *S. a. aurita* in the southern half of the Tropical Dry Forest (no *Sporophila* seems to be known from northern Guanacaste), but its numbers diminish southwest into the humid southwest, where *S. a. aurita* is most abundant. There I found it common only at two coastal localities (near Parrita and at Dominical), very uncommon in the Térraba region, and rare in the Golfo Dulce

region. Nevertheless I suspect it is gradually making inroads and may soon reach adjacent western Panama.

A species of the open and semi-open, it inhabits grassy and weedy fields, pastures, agricultural lands, low thickety growth and shrubbery in clearings and unshaded plantations, parklike areas, and beach scrub. It forages mostly for grass seeds, but it also takes insects and occasionally makes short, fly-catching sallies. Usually a number of birds are scattered over a site, and female-plumaged individuals are apt to keep together in small groups. Even during the breeding season, when individuals can be observed copulating, it roosts in chattering flocks in shrubbery and thickets, bustling in and out of cover well into the evening twilight.

Its sweet song often reminds me of that of the Field Sparrow (*Spizella pusilla*) in the United States, though of transposed pattern. Variations include several "cheep" 's uttered first on a higher and then on a lower level, or the first part faster than the second, then a following trill or two, to which one or two buzzes are often added. Also given are a sweet or a harsh vibratory "peep" and short, nasal, gnatcatcher-like mews.

***Sporophila aurita* (Bonaparte)**

VARIABLE SEEDEATER

RANGE: Southern Mexico to Peru.

***Sporophila aurita corvina* (Sclater)**

RANGE: Southern Mexico to northwestern Panama.

This, the Caribbean race, known as the Black Seedeater, is common to abundant from the lowlands through much of the subtropical belt, less frequent with increasing elevation, and more localized, well into the lower montane belt. It reaches the northwestern divide northward from Lake Arenal, from which it probably also occurs southward along the Cordillera de Tilarán, where it has not yet been recorded. If not absent it is at best a straggler in all of the plateau region. Evidently it prefers the humid life zones, though its habitat lies largely in the open and semi-open. It is almost completely sympatric with the congeneric *torqueola*, than which it is generally more abundant, and, un-

like the latter, may be common in suitable habitat in extensively forested regions.

It is found in greatest numbers in grassy as well as other ground cover. It also occurs regularly in leafy shrubbery open to the sky, and it rises not infrequently some 30 feet in the trees. On rare occasions I have met it with army ants. It is found as a rule in groups of several to many individuals, some of which may troop through the trees, say, in a plantation. The bird is also observed singly or in two's, usually in the denser and better shaded portions of the habitat. The black males occasionally show some white in the plumage: on the throat, along the edge of the wing, along the sides of the body near the edge of the wing (in both sexes), along the sides of the lower back, or along the shoulder.

The somewhat squeaky, rather unmusical song consists of chirps and chirrup given in the fragmented style of, but faster than, that of a vireo, such as *V. flavoviridis*. Disordered and confused, lacking terminal buzzes, this song is very different from the patterned one of *S. torqueola*. The call note is a squeaky "chirp" or "chir·urp."

***Sporophila aurita aurita* (Bonaparte)**

RANGE: Western Costa Rica to central Panama.

The nominate race is confined to the Pacific slope, from the head of the Gulf of Nicoya southward, with its center of abundance in the General-Térraba-Golfo Dulce sector. In the northern portion of its Costa Rican range it seems to be known only from the tropical belt, where its relatively small numbers suggest that this form suffers in competition with the congeneric *torqueola*. At its headquarters in the far southwest, where *torqueola* is largely absent, it ranges upward through most of the subtropical belt.

It occurs as a rule in groups that usually keep close to the ground, generally in open country, such as grassy or weedy fields and agricultural lands. Rather unlike the Caribbean *corvina*, it frequents dense thickety stands along the edges of woodland. Where *S. torqueola* is present and locally abundant, however, it tends to be displaced from more open areas to tangled, partially shaded second growth, such as that covering a formerly cleared hillside; moreover, the bird is here

seen singly. This is the sort of environment in which to expect *torqueola*, too, provided it includes some grassy openings.

A much better, sweeter singer than the Caribbean *corvina*, it has a canary-like song featuring many trills and a rich quality approaching that of *Oryzoborus funereus*, for example. Its call notes are a musical "chee" and a harsh "chirp." In thickets the bird often utters scrambled harsh notes. In view of the obvious differences in coloration and their divergent voices, it is by no means certain that *aurita* and *corvina* would not act as independent species if they were to meet, at least here in Costa Rica.

***Sporophila nigricollis* (Vieillot)**

YELLOW-BELLIED SEEDEATER

RANGE: Costa Rica to Peru and eastern and southern Brazil; Lesser Antilles.

***Sporophila nigricollis nigricollis* (Vieillot)**

RANGE: Costa Rica to Colombia and eastern Brazil; Lesser Antilles.

This South American species reaches its northernmost limit in southwestern Costa Rica, where previously it has been known from only two specimens taken in different years at the same site in the lower Térraba Valley. I met it at two other localities, one just within the lower limits of the subtropical belt in the general neighborhood of San Isidro del General, the other in the very wet, hilly lowlands at the head of the Golfo Dulce.

At the first locality, toward the end of June, I saw a few times what was probably the same individual, a brightly junco-patterned male, in different parts of a field overgrown with grasses and shrubbery. Singing from shrubs and low trees, it had a song very much like that of *torqueola*, starting the same way as that of the latter but not lasting so long; it also gave the chirp of a sparrow.

At the second locality, in March during the short "dry" season, I found the species daily in groups of several to dispersed concentrations of 50 to 100 individuals of both sexes. Here it occurred very locally at regenerating openings and cuts right to the woodland border amid formerly solid-forested surroundings. Together with the commonly present *S. a. aurita* and *Volatinia jacarina*, it was frequenting weedy growth, shrubbery, and

shrubs; I did not see it actually on the ground. Individuals were in all stages of plumage, including pale yellowish- or whitish-bellied males. The only sounds given were unclear chirps. At the end of every day during my two-week stay the birds took off in groups of six to 12 in unhesitating high flight cross country, as do goldfinches or longspurs, to spend the night an unknown distance away.

***Sporophila minuta* (Linnaeus)**

RUDDY SEEDEATER

RANGE: Mexico to Bolivia and northeastern Argentina.

***Sporophila minuta centralis* Bangs and Penard**

RANGE: Southwestern Costa Rica and Pacific slope of Panama.

The Ruddy Seedeater of wide neotropical distribution is known in Costa Rica from only two areas in the upper Térraba Valley: the general neighborhood of Buenos Aires and around Boruca. Of the three species of *Sporophila* confined to the far southwest, only this one, in my experience, is exclusively a "savanna" bird. In general it is seen irregularly, but at certain sites can be met daily during part of the year. Usually it occurs in lively bands that wander about locally or seasonally or perhaps both. The birds frequent the grasses and wiry bushes of the open "savannas" and sweep through dense thickety stands in the immediate vicinity.

***Amaurospiza concolor* Cabanis**

BLUE SEEDEATER

RANGE: Southern Mexico to western Ecuador.

***Amaurospiza concolor concolor* Cabanis**

RANGE: Southern Mexico to Panama.

This rare finch is known from a very restricted range along the partially deforested slopes of the mountains in the north-central and northwestern parts of the country. It was recorded previously only from the Pacific slopes of Tenorio and Miravalles volcanoes at lower-subtropical altitudes. A specimen reported by Bangs (1907b, p. 311) from Boruca in the far southwest, which I suspected was completely out of range, cannot

be found in the Museum of Comparative Zoölogy at Harvard College, probably because of corrected misidentification. I met it at three places: Bajás del Toro (Finca Los Cedros) in the lower montane belt on the northwestern slope of Poás Volcano, Monteverde in the wet upper subtropical belt on the Pacific slope of the Cordillera de Tilarán, and the lower-subtropical western face of Miravalles Volcano.

Apparently the preferred habitat lies in wet-forested hilly terrain, where the bird frequents shrubs and tall grass in the semi-open and, probably more typically, mixed shrubs, small trees, and thickety growth along the borders of woodland. Nearly every time, the bird was working its way through the concealment of shrubby growth between 1 and 2 yards from the ground. Only at Miravalles did I see it in the grassy bushy "field" habitat favored by seedeaters. The same course was followed daily, thus suggesting established foraging rounds. I saw either sex only singly. Here in Costa Rica, "Blue" Seedeater is a misnomer. Both sexes show a strong resemblance to the corresponding ones of *Oryzoborus funereus*.

The male is known instantly by its call. My several transcriptions run to the same pattern: a sort of halfhearted singsong, "wee awee awee awee awee"; several descending despondent "wee" 's; a slightly downscale "wü tiwü tiwü tiwü-oo" given, as it were, with ebbing enthusiasm; a descending, rather querulous "wheer awheer," and so on; several similar notes on the same level with only the last weak and low. I do not know the call note.

***Oryzoborus funereus* Sclater**

THICK-BILLED SEED FINCH

RANGE: Southern Mexico to western Ecuador.

This great-beaked small finch, deemed rare by Carriker in 1910, is distributed over the humid life zones on both slopes. On the Caribbean side it is fairly common the length and width of the lowlands and rises in lessening numbers into the lower subtropical belt on the northern and eastern sides of the Cordillera Central, probably also on the Talamanca Cordillera; it is not reported from the

northwestern divide. On the Pacific slope it is known only from the General-Térraba region, in the upper tropical and into the lower limits of the subtropical belts. Its preference for open country is that of seed-eaters and grassquits generally, though it tends to favor habitats with small trees and shrubs over open grassy fields, thus approaching the Blue Seedeater.

The Thick-billed is often found with other small field finches but in much smaller numbers. Usually it is seen alone, the sexes generally keeping apart, and in most places is not gregarious with its own kind, yet it is sometimes met in small concentrations of singing males. The male often returns to a favorite singing perch, such as the top of a bush or the branch of a small tree, when he can sometimes be approached quite closely. If disturbed, he is apt to rise to another branch and continue his song. The female, on the other hand, is hardly ever seen outside tangled grass and undergrowth. A specific trait, perhaps a nervous response to being closely watched, is one in which the tail is either whipped from side to side or held askew for a pause of varying length.

Its clear musical song is not especially loud; sometimes the bird seems to be singing to itself. Unlike that of any other seedeater in the country, it consists of a deliberate, slow-paced, uninterrupted series of more or less similar, mellowly whistled phrases that terminate in a rising querulous note. The notes are not doubled or paired, yet the song reminds me of that of the Indigo Bunting in the United States. Though far superior in quality, its measured pattern may suggest that of the yellowthroat *Geothlypis semiflava*, and it may even end similarly, with a slur. Female-plumaged birds apparently sing as well as the adult male. I watched such an individual, perched several feet up, singing softly through closed bill the squeaky song of the Black Seedeater in a locality where it was rare and the latter very common. The call note sounds like "ik" or "ek."

***Volatinia jacarina* (Linnaeus)**

BLUE-BLACK GRASSQUIT

RANGE: Mexico to Chile and north-central Argentina; Grenada.

***Volatinia jacarina splendens* (Vieillot)**

RANGE: Mexico to Peru and Amazonia; Grenada.

One of the most common birds of Costa Rica, the Blue-black Grassquit is distributed from both coasts to upper subtropical elevations the length of the country. It is most abundant in the humid life zones, absent from dry-forested Guanacaste north of the lower Tempisque Valley. Except for the deforested central plateau, it is generally uncommon above 2500 feet or so.

This grassquit is exclusively an open-country species that inhabits grassy fields, bushes and small trees in cleared areas to the borders of woodland, and overgrown boundaries. Its usual companions include various seedeaters, the grassquit *Tiaris olivacea*, and the yellow-throat *Geothlypis poliocephala*. Though gregarious with its own kind, it usually acts independently of its companions. It exhibits flocking behavior at the time of year that coincides with the spring and fall migration of birds from the north. Especially when in groups, it may fly in retarded dips, such as those of the displaying manakin *Corapipo altera*.

During most of the year the male, perched on an exposed twig or stem, has the curious custom of jumping a foot or more straight up and lighting at almost the same spot. As he makes this quick leap, approaching at times a somersault, he holds his spread tail higher than the head while his opened wings expose a white "shoulder" mark. The maneuver is accompanied by an insect-like, buzzy, two-level "zrrrr zir" or a slightly buzzy "szeeyèw" (one syllable) which ends with a between-the-teeth little whistle or an absurd little buzz, "tsrzz tskzzz." The bird also calls without jumping, when it generally flutters its wings. Though the male, including the subadult, doubtless performs to attract a female, he is seldom obviously successful. Notwithstanding, he continues to leap and to call tirelessly. Perhaps the female is overcome additively.

Spinus xanthogaster* (Du Bus)*YELLOW-BELLIED SISKIN**

RANGE: Costa Rica to Bolivia and western Venezuela.

***Spinus xanthogaster xanthogaster* (Du Bus)**

RANGE: Costa Rica to Colombia and western Venezuela.

The Yellow-bellied Siskin, a South American species, is at its northern limit in Costa Rica. Here it is distributed at high altitudes, where it is known almost exclusively from the central highlands, including the Dota Mountains. It has been reported once on the Talamanca Cordillera (Carriker, 1910, p. 914), the length of which it probably occurs. There is no record from the northwestern divide.

The species is most abundant and can be met regularly in the montane belt. Though rarely seen below the lower montane belt, it has been reported to approximately the middle of the subtropical belt and even to the lower limits of the belt on steeply descending slopes. It seems to prefer the parklike pastures bordered by woodland high on the mountains and frequents the trees at almost all heights. Generally it is seen in small groups and in pairs that travel about as do goldfinches.

Spinus psaltria* (Say)*LESSER GOLDFINCH**

RANGE: Western North America to Peru and Venezuela.

***Spinus psaltria colombianus* (Lafresnaye)**

RANGE: Southern Mexico to Peru and Venezuela.

The Lesser Goldfinch, just like the preceding species, is distributed from the central highlands, where it is most abundant, southward toward Panama. I found it at upper tropical elevations in the Térraba Valley in the far southwest, where it may be a seasonal wanderer from the Talamanca Cordillera. It is probably also present on the Caribbean side of the cordillera. There is no report from the northwestern divide. Complementing vertically the distribution of the congeneric *xanthogaster*, it inhabits the subtropical belt primarily, from which it rises somewhat above the upper limits of the belt.

An open-country species, it occurs mostly in generally deforested areas and visits clearings with scattered tall trees in forested tracts. It may forage at all heights in the

trees and frequents thickety growth mixed with trees. Its range and habitat closely parallel those of the euphonia *Tanagra elegantissima*, for example. It is seen either alone or flying about in pairs. It flies well and for good distances in typical goldfinch-like dips, when it flashes a white mark in the wings. The usual notes are a musical, sweet but sad, lingering "psee" or "psee-ee," which may also be given, goldfinch-like, in flight, and a sort of "chek-ek." I did not hear its song.

[*Sicalis luteola* (Sparman)]

YELLOW GRASS FINCH

RANGE: Local from southern Mexico to Panama; in South America to Chile and south-central Argentina.

I met this previously unrecorded yellow finch several times during the first week of May, 1955, at Hacienda Miravalles, a large cattle ranch in the upper portion of the dry-forested tropical belt in Guanacaste Province. The species was present in the scrubby cattle lands on the flat western approach to Miravalles Volcano. I saw the bird singly, in two's or three's, and in bands numbering at least 50 individuals in recently burned pastures. The males looked as yellow as goldfinches at rest and in the air, where the dipping flight was goldfinch-like, too. For this as well as geographic reasons I assume that they were the Panamanian race, *eisenmanni*, described by Wetmore (1953, p. 9).

The bands were foraging quite fearlessly on and just above the ground amid the stubble. Individuals were continually making a guttural bicker or buzzy or chirping twitter. Given by the band as a whole, the notes resembled insect-like buzzings. The birds moved about with jerky little hops, stiff little steps, and in running walks and running hops. When not foraging, they momentarily perched sideways on the grass stems. The date and the occurrence in bands suggest that the species was migrating through the area.]

Spodiornis rusticus (Tschudi)

SLATY FINCH

RANGE: Locally from southern Mexico to western Panama; Colombia and northern Venezuela to eastern Peru and Bolivia.

Spodiornis rusticus barrilesensis Davidson

RANGE: Costa Rica and western Panama.

Carriker (1910, p. 893) did not meet this rare species, nor definitely did I. It is known in Costa Rica from only four localities, all in the eastern portion of the central highlands: the northern and southern slopes of Irazú Volcano and the general vicinity of Cartago, from the subtropical belt into the lower limits of the montane belt.

Eugene Eisenmann, who found it at about 5000 feet in the Volcán district of Chiriquí, Panama, generously supplied the following notes: "I saw this species on July 11 and 14, 1948. The spot was at the edge of the road, less than a hundred yards from the sharp ecological division between the open sterile llanos, formed by the last lava flow of the volcano, and the rich montane forest on the steeper slope above the flow. Though within the forest zone, the immediate locality had been somewhat cut over and there was grass and dense bushy second growth, only partly shaded by high old trees. On July 11 I saw a group of four birds on the ground, apparently feeding (or taking grit) at the roadside. . . . On July 14 at the same place I observed a male and female on the ground at the side of the road. . . . Though I have visited the locality a number of times since 1948, at this writing (1960) I have never observed the species again."

Acanthidops bairdi Ridgway

PEG-BILLED FINCH

RANGE: Costa Rica.

This rare Costa Rican endemic is confined largely to the high volcanoes in the center of the country. A specimen from Escazú (near San José) was almost surely taken in the mountains south of that town. Carriker (1910, p. 894) wrote: "The first one I took was on Irazú above timber-line, not far below the summit of the volcano, where it was perched on the tip of a scrubby bush and apparently alone. In April, 1907, while collecting near timber-line on the Volcan de Turrialba, a small flock of perhaps five or six birds came flying along the edge of a patch of trees, alighting just over my head. . . . Another single male was taken the same day in a dense thicket at the base of the crater." Anastasio Alfaro (1890, translated) found it near the

summit of Poás Volcano: "This bird is active and extremely wary, is fond of the company of *Chlorospingus [pileatus]*. . . . Often it is to be seen moving lengthwise along the dry little branches, as though attempting to search out the small insects that are on them." Nothing else seems to have been published on the bird in life. I did not find it.

***Pezopetes capitalis* Cabanis**

LARGE-FOOTED FINCH

RANGE: Costa Rica and western Panama.

This large heavy finch is distributed over the high mountains from the Cordillera Central southward along the Talamanca Cordillera; it is absent from the northwestern divide. Abundant in and mostly confined to the montane belt, it rises commonly above timber line. It becomes rare or local at lower elevations, although occasionally recorded from the upper subtropical belt between Cartago and the northern end of the Talamanca Cordillera.

The Large-footed Finch is primarily terrestrial on the floors of gullies, ravines, and other breaks covered with thickety or canelike vegetation, along bushy edges of clearings and borders of woodland, and in tangled brushy undergrowth. Either alone or in two's, it hops as springily as a robin and forages energetically by scratching with both feet at once. It also hops without a sign of discomfort on mossy, very steep, rocky faces and rises several feet into shrubs and shrubbery, where it moves about heavy-bodiedly and continually flicks its wings. Singing in a fragmented robin- or vireo-like manner, it utters abrupt, rather squealing phrases. It also makes a liquid "churr."

***Pselliophorus tibialis* (Lawrence)**

YELLOW-THIGHED FINCH

RANGE: Costa Rica and western Panama.

The Yellow-thighed is another high-altitude finch distributed mostly in the central highlands. Though not reported previously, it probably occurs the length of the Talamanca Cordillera, where I found it at 9500 feet on the northern sector. It is absent from the northwestern divide. Upward from about 4000 feet to timber line, it is one of the most common birds in the central highlands. It does well in most kinds of habitat with the

exception of bare fields. It does not now occur on the largely cleared central plateau, where formerly it was recorded from a number of localities. It frequents bushes and brush in uncultivated open areas, timbered, parklike, highland pastures, thickets and shrubbery along woodland edges, and heavy forest. Generally it keeps within a few yards of the ground on fallen trunks and brush, also on the ground, and rises well up in trees in woodland.

Almost without exception it travels, or circulates, in small bands. Should a single bird be encountered, other individuals are certain to be close by. Its diversified foraging parallels its variety of habitats. An omnivorous species, it brings to mind an atlapetes when rummaging in undergrowth or hopping on the ground, certain tanagers when passing through thickets and new growth, ovenbirds when climbing vines or creeping along branches, and wrens when in tangled brush. Sometimes wary but often bold, it does not purposely seek concealment. It quickly reveals its presence by rustling leaves or exaggeratedly shaking stems and twigs. Moreover, an individual regularly shows itself in a gap or comes out into the open, and the bands are noisy and frequently argumentative. Its relatively long tail is constantly lifted and lowered. Raised as though windblown when the bird alights, it seemingly wafts its owner off balance, as in an ani. Rather short-legged, the bird has some of the awkwardness again of an ani instead of the sprightliness of a finch when it hops on the ground. The adult is known in any posture by the bright "thighs" that sprout like lemon-colored puffballs from the belly. An occasional bird shows some white at the wing bend. Flight, in general, is low, twisting, hedgehopping, and of short duration, but may consist of clean gliding breast strokes when the bird takes off from a high perch.

Its weak voice, readily employed, hardly differs from that of many neighboring birds, yet the notes have a distinguishing "spinking" quality. These include a single "spink," a series of weakly "spinking" metallic "tsip" 's, rapidly "squissing" and squealing sounds, a high-pitched gabble, and a dull rattle similar to that produced by a dry leaf fluttering in the breeze.

***Atlapetes gutturalis* (Lafresnaye)**

YELLOW-THROATED ATLAPETES

RANGE: Southern Mexico to Colombia.

***Atlapetes gutturalis brunnescens* Chapman**

RANGE: Costa Rica and western Chiriquí Province, Panama.

The Yellow-throated Atlapetes is distributed in the middle altitudes on both slopes along the core of mountains that orient the country, from the Cordillera de Tilarán, where I found it abundant at Monteverde, to the Panamanian border, where I met it commonly in the Cañas Gordas district. It is most plentiful in the subtropical belt, especially the middle and upper portions, rises in good numbers into the lower montane belt, and may wander higher into the montane belt. It is probably most abundant in the central highlands, and the species is widely distributed over the foothills and slopes in Cartago Province. The Costa Rican and western Chiriquí populations are continuous, and I cannot separate them. Indeed, a fresh specimen (U.F.C. No. 8959), which I took in the Cañas Gordas district jutting into Chiriquí Province, is darker above than any other example of the species in the American Museum of Natural History. Back color unquestionably fades with time, hence is a useless character for the separation of the populations named *parvirostris*, *brunnescens*, *decoloratus*, and nominate *gutturalis*.

This nonforest atlapetes is very common in largely deforested areas, such as the central plateau region. It is present, too, at least locally, at openings in heavily forested regions. It is found for the most part in dense bushy growth in the open and semi-open, at overgrown roadsides and streamsides, and beside woodland, but it may rise some 60 feet in patches of forest. Generally it is seen in small active groups, also in two's, in the cover provided by bushes, hedgerows, and shrubbery, and individuals may drop to the ground to forage. It seems to be sedentary at a site. A bird of eager, exaggerated movements, it has the habit of raising and lowering its tail in the manner of an undergrowth-inhabiting antbird, moves its head up and down, and stretches its neck. It flies little, in fluttering dips with tail partially cocked. Over the pla-

teau region, incidentally, this species is a favorite host of the parasitic cowbird *Tangavivus aeneus*.

Its weak call note is a high-pitched, thin, sibilant "sst," "psst," "sr," or "tsr." What may be its "song" is a formless series of squeaky "pulley" notes, also sounding a bit parrot-like, mixed with several-syllable descending churrs. I failed to hear a better song.

***Atlapetes brunneinucha* (Lafresnaye)**

CHESTNUT-CAPPED ATLAPETES

RANGE: Mexico to Peru and Venezuela.

***Atlapetes brunneinucha elsae* Parkes**

RANGE: Costa Rica and western Panama.

The Costa Rican distribution of the Chestnut-capped Atlapetes is almost identical to that of the congeneric *gutturalis* of different habitat. Here the species, as represented by the race *elsae* (Parkes, 1954, p. 135), is widespread and abundant in the entire mountainous central part of the country. In smaller numbers it extends toward Panama along the Talamanca Cordillera and northwestward to Lake Arenal along the Cordillera de Tilarán, where it is common locally. Though found from the lower subtropical belt (or even lower) apparently to timber line (Carriker, 1910, p. 899), it is most common at the middle altitudes, i.e., from about the middle of the subtropical through most of the lower montane belts. It inhabits very humid forest in which it occurs on or near the ground in undergrowth, especially in ravines, from the gloomy interior to the forest border. To encounter it even a little way outside woodland is an unusual experience.

The bird associates with its own kind in small parties that rummage on the moist floor, flick aside trash, and flit through undergrowth in the vine-covered understory; I have not seen it more than 10 feet up. Like a covey of ground birds, the members individually make a fluttering dash across a trail. The groups seem to roam widely, are apt to show up almost anywhere, but are not encountered often. The birds are wary and move about so actively that it is difficult to see one clearly. One receives the impression that, too busy to waste much time in one place, the birds must be seen now or never. Never-

theless they exhibit an oblique curiosity and may not flee from a motionless intruder. The sharply delimited white throat, invariably puffed to a ball, usually diverts attention from the other features of the bird, as does also the tail, which, as in certain antbirds of similar habitat, is constantly raised and lowered "nervously."

The voice is poor even by atlapetes standards, and the weak notes hardly prepare the observer for this attractive large finch. Usually the bird makes a very thin, almost inaudible "tsink" and extremely high-pitched, piercingly thin "snn" 's. What appears to be the "song" is either a simple high thin "spee" or a two-syllable "speee·tst" or "spiss-spiss." Several birds may utter continuously a thin "ss ss ss," and so on, of no set pattern.

Atlapetes torquatus (Lafresnaye and d'Orbigny)

COLLARED ATLAPETES

RANGE: Southwestern Costa Rica and adjacent western Panama; eastern Panama to Venezuela and northwestern Argentina.

Atlapetes torquatus costaricensis (Bangs)

RANGE: Southwestern Costa Rica and adjacent western Panama.

This atlapetes is confined to the humid-forested Pacific slope southward from the entrance to the Gulf of Nicoya. So far as known, it is distributed mostly in the upper tropical belt. But in parts of the General-Térraba region, the only area in which it seems to be common, it rises well into the subtropical belt, mostly on the slopes of the Talamanca Cordillera. I did not happen to find it farther south in the Coto Brus, Río Colorado, and Cañas Gordas districts or in the Golfo Dulce region. In contrast to *brunneinucha* and *gutturalis*, it occurs neither in forest nor in the open.

The Collared Atlapetes dwells almost exclusively in shaded brush, thickets, and tangled second growth that border tall woodland. I have not seen it higher than the tops of tall thickets and the lower parts of trees. It forages within the maze of interlaced undergrowth and vine-netted thickety tangles, where it dissolves into the background. Habitually it descends to the littered brushy floor, and there it is capable of diving into

trash, like a rodent, while the observer waits vainly for it to emerge. Though shy, secretive, and quick-moving, this heavy-bodied finch may, in common with its congeners, permit an occasional quiet inspection. Its crown feathers are often raised and its throat partially blown up. A puffed throat, contrasting brightly with the surrounding plumage, is exhibited by several different kinds of birds that live in dim thickets and shadowy undergrowth. It is encountered singly, more often in two's, unlike the gregarious *gutturalis* and *brunneinucha*.

Its voice is of poor quality and surprisingly weak for a bird of its size. The song, a very high-pitched thin "tsitting" trill or gush of wave-patterned "tit" 's (or "sit" 's), sounds either insect-like or like the tinkling of a fine-linked silver chain. The usual call note is a penetratingly thin "tsit" or "tsint." The bird also makes a vibratory "chirrr" or "cherrr."

Lysurus crassirostris (Cassin)

BARRANCA FINCH

RANGE: Costa Rica and western Panama.

The well-named Barranca Finch inhabits the lower middle altitudes, mostly between 3000 and 4000 feet in the subtropical belt. It rises to an upper limit of at least 6000 feet and descends cool pockets to perhaps 1500 feet, as at Carrillo. Primarily a Caribbean species, its range follows the Cordillera Central from the Aguacate Mountains and Poás Volcano eastward to the foothills and slopes that approach the plateau region and the northern sector of the Talamanca Cordillera (along which it has not been reported but probably continues southward to Panama, at least on the Caribbeanside). It has been recorded, additionally, from the Dota region but from no other place on the Pacific slope, and it is as yet unknown from the northwestern divide. Virtually confined to very humid, forested regions, it is either absent from or rare in the greater part of its mapped range. But it can be encountered occasionally or, under especially favorable conditions, up to several times daily in the forested Reventazón watershed and here and there on the north face of the Cordillera Central.

The species is generally found in small bands or, during the breeding season and for a while thereafter, in two's or three's, seldom

alone. As a rule it occurs in or beside wet woodland that borders swift rivers, streams, or streamlets, either along the banks or on the slopes of the valleys and ravines, or barrancas, through which they flow. Similar in its actions to *Atlapetes brunneinucha*, which it rather resembles in appearance, it forages actively within the cover of dense undergrowth and also on the ground. The two species can occur together, but the Barranca does not enter deeply into densely forested tracts. Apparently it prefers wildly tangled ground cover in openings or thickety second growth dominated by great trees. Also, it is relatively easy to see, because it exposes itself regularly on a vine or twig in a gap in the luxuriant vegetation, or even on a trail, where its heavy-bodied hops and twitching and jerking movements attract the observer's eye. It may rise several yards to forage in low trees, often clinging to pluck berries, but soon drops to the protective undergrowth. Unlike *Atlapetes brunneinucha*, it does not seem to avoid bright light, nor have I seen it flick aside limp trash covering the muck, mold, and decay on the forest floor.

One of its calls consists of two, sometimes three, penetratingly thin and peeping, almost sibilant, whistles, something like "pseè seé," or "psín psín," or a deliberate "pss psé." Sometimes "pinging," it brings to mind the jay *Cyanolyca cucullata*. Given as a single sharp "pseenk," it might be confused with the note of the flycatcher *Empidonax flavescens* or the Wren-Thrush (*Zeledonia*). In its usual form it suggests that of an *atlapetes* (*A. brunneinucha*), but it is more powerful and arresting. The bird also delivers a series of rather slow, piercing "ss" 's or "ssn" 's, not unlike those of the Caribbean form of *Arremon aurantirostris*, but either long-continued or grouped into a four- or five-note pattern generally similar to but quicker than that of *Arremon*.

***Arremon aurantirostris* Lafresnaye**

ORANGE-BILLED FINCH

RANGE: Southern Mexico to Peru.

***Arremon aurantirostris rufidorsalis* Cassin**

RANGE: Honduras to northwestern Panama.

Arremon aurantirostris aurantirostris

Lafresnaye

RANGE: Southwestern Costa Rica and western Panama.

The Caribbean *rufidorsalis* is distributed the length and width of the country, from the coastal plain well into the subtropical belt, overlapping the northwestern divide, so far as known, northward from the Arenal gap. The race *auranti-rostris* is nearly confined to the humid southern half of the Pacific slope, with a slight northward extension to approximately the Río Grande de Tárcoles, from the coast well into the subtropical belt in the Dota region and along the Talamanca Cordillera. The species is absent from the central plateau and virtually all the dry-forested northwest. It is most abundant at the lower elevations and is still not uncommon at 3000 feet.

This semiterrestrial finch is primarily a forest species that spreads into shaded second growth and brushy clearings within woodland. It frequents low branches and thickets close to the relatively open forest floor as well as the most tangled undergrowth, and it moves about with equal facility on the ground, where it hops and scratches; it seldom rises above the lower understory. Rather a solitary, sedentary bird, it is usually seen singly or in somewhat separated two's. In common with other finches that inhabit the lower levels in forest, it is largely insectivorous. Disturbed, it gives its call note and nervously flicks its wings and tail and shifts its hindquarters from side to side. It responds inquisitively to squeaking, when it can be glimpsed moving about at close quarters. It is much easier to approach than other woodland finches, such as *Atlapetes brunneinucha* and *Lysurus crassirostris*, the species closest to it in general appearance and habits.

The song of the Caribbean *rufidorsalis* resembles that of a hummingbird, *Threnetes ruckeri* in particular. It consists of about five notes of equal length, except for the short middle one, very high in pitch and weak in volume, sounding like slow thin squeaks expressed with effort through too small an aperture. Two whining notes, like those of the greenlet *Hylophilus ochraceiceps* or of an antwren (*Myrmotherula*), may accompany it.

The hard call note, "tsit" or "tsick," may be as sharp as that of the grosbeak *Cyanocompsa cyanoides*.

The southwestern *aurantiistrois* sounds very different. Its song, characterized by a jumbled rapidity instead of a dragging slowness, is a lively "tisselee tisselee tisselee," or a squeaky series of notes similar to those of the tanager *Thraupis palmarum*, or a series of high "tsink" 's that jump irregularly as do those of the finch *Atlapetes torquatus*, or a brisk, squeaky, rising trill. Also given are a rapid thin trill and a level rattle. Its call note is a sibilant or wiry thin "tsip" or piercing "tsmp."

Arremonops rufivirgata (Lawrence)

OLIVE FINCH

RANGE: Southern Texas to Costa Rica.

Arremonops rufivirgata superciliosa (Salvin)

RANGE: Northwestern Costa Rica (and possibly adjacent Nicaragua).

The Olive Finch, after a spotty Central American distribution, reappears in good numbers in northwestern Pacific Costa Rica. Centered in the Tropical Dry Forest, it rises commonly on the lower slope of the Guana-caste Cordillera and spreads to the central plateau west of San José. This distribution coincides with that, for example, of the wren *Thryothorus pleurostictus*, a member of the Central American arid Pacific avifauna, and the two species are almost always found together. The Olive and the congeneric *conirostris* narrowly overlap each other at the transition between the tropical and subtropical belts along the northwestern divide. Elsewhere, in contrast to *conirostris* of the humid life zones, the Olive lives in scrubby ranch lands mixed with patches of woods, thickets, and gallery-wooded streams, never in the open or away from cover. The Olive is considerably smaller, and lighter and quicker in movement, than the heavier-bodied *conirostris*.

Though it is usually seen singly, sometimes in two's, the presence of one individual indicates that of others scattered in the vicinity. The bird frequents thickets, brush, and low branches, creeping with its tail cocked, like a wren. It goes to the ground regularly to forage among the fallen leaves, hopping about

inconspicuously, flicking its tail from time to time, and perhaps singing sporadically. It delivers the full song over and over, freely and at leisure, usually from a favorite perch at the top of a small or medium-sized tree. Twittering or cheeping, it usually begins with a few separated notes, then reiterates a single note in acceleration. The pattern somewhat resembles that of *conirostris* (in Costa Rica), but the song is not musical and could never be mistaken for that of the latter. There is a good deal of variation among individual birds. The acceleration may rise, fall, follow the same level, or be pitched differently from the introductory notes. Given more commonly is a characteristic dry "picket-fence" chatter similar to the rattle of its neighbor, the wren *Thryothorus pleurostictus*. The call note is a simple warbler-like "tsip."

Arremonops conirostris (Bonaparte)

GREEN-BACKED FINCH

RANGE: Southern Mexico to western Ecuador and Venezuela.

Arremonops conirostris richmondi Ridgway

RANGE: Southern Honduras to western Panama.

The Green-backed Finch is distributed over much of the country, commonly from both humid-forested coasts into the lower subtropical belt, occasionally into the lower montane belt in the central highlands. Along the northwestern divide it is common at the Arenal gap, very local north of it, and not recorded south of it. It is rare in the dry-forested northwestern lowlands and absent from virtually all the central plateau. A non-forest species, its preferred habitats include clearings, plantations, bushy edges, hedgerows, and parklike areas with shrubbery. It is uncommon even in suitable habitat in extensively forested regions. Except when selecting an elevated perch from which to sing, it usually moves about low in shrubbery, bushes, and low trees. It drops to the ground regularly, where it progresses with ease. Only in the Río Frío region did I see it with army ants.

Though often dwelling in proximity to man, who has created for it so many suitable situations, the bird is shy to the extent that it seeks to hide from close observation, which

is not intended to imply that it is not to be seen commonly. In general it is met alone or in two's, sometimes in small groups on the ground. Its relatively short tail, seemingly inserted low in the rump, as though under a ledge, and often appearing bedraggled, with jagged tips and brokenly webbed vanes, is quite often carried a little cocked. One of the field marks, the bright yellow wing bend, becomes even more apparent when the bird flies.

The distinctive call can be recognized immediately in any of its numerous but relatively slight variations. Consisting of a single note in repetition, it begins slowly, accelerates, and terminates in a high-pitched trill; occasionally the trill is followed by a barely audible, almost supersonic thin whistle, like steam escaping through a valve. The pattern has been likened to the rolling of a marble down a flight of stairs and to a locomotive starting and gathering speed. The individually variable, often musical notes sound like "choo," "chyeu," "chowp," even "wick" or "peep," sometimes doubled. Also given are a whining, antbird-like cry that often accompanies a chase between two birds, a resonant "chup," a short "choorp," and a very high, thin "wsnt."

Melozone biarcuatum (Prévost and Des Murs)

PRÉVOST'S MELOZONE

RANGE: Southern Mexico to Costa Rica.

Melozone biarcuatum cabanisi
(Sclater and Salvin)

RANGE: Costa Rica.

Prévost's Melozone is represented in Costa Rica by an endemic form confined to the central part of the country. It is distributed over the entire subtropical central plateau and to lower montane elevations on the facing slopes. The farthest eastward extension is near the town of Turrialba, at the lower limits of the subtropical belt, where I have a lone observation; westward it has been recorded from the Aguacate Mountains. The bird is not known from the northern face of the Cordillera Central or south of the hills that border the southern edge of the plateau from Turrubares to Cartago-Paraíso.

This ground finch is strictly a nonwoodland bird that inhabits grass and scrub,

thickety growth, and coffee plantations. As noted for El Salvador by Dickey and van Rossem (1938, p. 569), the species may have taken a new lease on life by having adapted to the coffee fincas in Costa Rica, too. Keeping to the undergrowth and the lower branches of shrubs and small trees, it drops to the ground to forage. Sometimes it is very wary; at other times it may hop unconcernedly in grassy dooryards. It seems to be sedentary at least part of the year at a particular site. It is not common and generally is seen seldom, either singly or in two's. The only species with which it might come in competition are the congeneric *leucotis* and the ubiquitous sparrow *Zonotrichia capensis*; apparently it may react aggressively toward the latter. No skin that I have seen, incidentally, does justice to the remarkable facial pattern of this melozone. Sometimes the bird appears steep-foreheaded when its crown feathers are raised. What may be its simple "song" is a rapid series of chirping "chep" 's. The call note is a weak, clipping "tsit."

Melozone leucotis Cabanis

WHITE-EARED MELOZONE

RANGE: Southern Mexico to Costa Rica.

Melozone leucotis leucotis Cabanis

RANGE: Costa Rica.

The distribution of the endemic race of White-eared Melozone nearly duplicates that of the congeneric *biarcuatum*. All previous records pertain to the central part of the country, where it is nearly restricted to the plateau region and the neighboring mountain slopes. Though recorded from many localities in the past, the bird seems to be much rarer today than *biarcuatum*. It occurs sparingly in some of the same places and the same habitat as *biarcuatum*, but I also met it on bare ground in a grove of planted cedars considerably above the range of *biarcuatum* on Irazú Volcano. There is an old record for Carrillo at the base of the wet northern slope of the Cordillera Central, a region in which I did not happen to find it. But to my great surprise I found it abundant at Monteverde, a Quaker colony on the upper subtropical, very humid Pacific side of the Cordillera de Tilarán.

On the central plateau it seems not to frequent well-tended coffee fincas, most of which

are on fairly even ground. Instead it is apt to be present at bushy growth in coffee lands on steep slopes and also in wild second-growth thickets and tangles. At wet-forested Monteverde it inhabits overgrown forest edges and thinned forest now regenerating with intermediate second growth. The bird is seen singly and in two's, accompanied or not by a fledged young or two, and also in small, perhaps family, groups of three or four. It keeps low in shrubbery, brush, grass mixed with bushes, and the understory of subforest and the periphery of forest; I have not seen it higher than 15 feet in the trees. Evidently it forages mostly on the ground, where it hops springily. In the central plateau region I observed it scraping the ground with both feet at once and the very next instant making an exaggerated leap straight up, yet I never saw the bird do this at Monteverde, where it is so abundant. It is not particularly shy, but flicks its usually raised tail when disturbed. A heavy-bodied bird, it flies rather slowly, with a loud steady flutter, in a straight line from which it may suddenly veer sharply and awkwardly in the manner more of a quail than a spurting agile sparrow.

Its call consists of a sibilant note repeated five to 15 times in a series that begins weakly and fades as it ends. The bird keeps low, but the sound seems to come from up in the trees. When two or possibly more birds call together the result is a confusion of rapid excited "s" 's and "sz" 's breaking out unexpectedly in the style of a flock of large swifts (*Streptoprocne zonaris*). The call note is a sharp, thin "tsip."

***Ammodramus savannarum* (Gmelin)**

GRASSHOPPER SPARROW

RANGE: North America and locally from southern Mexico to western Ecuador, also Greater Antilles.

***Ammodramus savannarum bimaculatus* Swainson**

RANGE: Southern Mexico locally to Costa Rica.

The Costa Rican population of Grasshopper Sparrow is virtually confined to the Pacific northwest along the base and deforested slopes of the Guanacaste Cordillera. Two old reports from the central plateau, if not erroneous, surely pertain to individuals

"rarely straggling up into the interior, as seen by the records of Frantz (San Isidro and Guadeloupe)" (Carraker, 1910, p. 911). It is largely a terrestrial bird which I found only in grassy fields and pastures, burned over or not, generally on old lava flows. Among its habitat-sharing associates are the wren *Salpinctes obsoletus* and the sparrows *Aimophila borderii* and *Aimophila rufescens*, all of similar restricted range. It also occurs with the wide-ranging meadowlark *Sturnella magna* and the quail *Colinus leucopogon*, from the grassy volcanic slopes down to the upper tropical belt or lower, as at Hacienda El Pelón in northern Guanacaste. During most of the year the bird scarcely shows itself in the heavy rains, driving mists, and galelike winds that sweep across the open terrain.

Usually it is seen flushing singly from grass. It flies in fluttering dips, longer or shorter in direct relation to the length of the flight, before diving into a grassy clump or dropping behind a rock. Having marked the spot, the stalking observer may find the bird unconcernedly following a rut or a hidden cattle trail or sitting motionless and tight on the ground. When foraging, this flat-headed, short-tailed little bird both walks and runs. Its walk, often punctuated by a nervous jerk of the tail, is a hunched stepping seemingly given impetus by the wings flicking open and shut. When running, the bird keeps its wings tightly folded, as if tucking its hands each into a pocket, lowers its head, and scurries like a mouse through the grass.

The bird selects a raised perch, usually a stone or a great boulder or perhaps the branch of a stunted tree, from which to "sing." It stretches its neck, raises its head, opens its bill, and produces its buzz. This extremely simple sound, more like that of an insect than the song of a bird, is a protracted "tszzzzzz," usually preceded by a little "tsick" or a "tuptip." Typically, the grasshopper-like buzz is given on an even plane, but it may also undulate. A twittering series of insect-like sounds much harder to identify is also made. During intervals of silence the bird stands with its head depressed to body level, its sharp-tipped tail higher than the head, and its body horizontal or inclined stiffly downward at an acute angle with the oblique stance of its legs. The bird may then

look about while moving its head and body as a rigid unit from side to side and rhythmically pulsating its wings. Should the bird change perches, it flies in a sustained flutter quite different from the normal dipping flight.

Aimophila ruficauda (Bonaparte)

RUSSET-TAILED SPARROW

RANGE: Central Mexico to Costa Rica.

Aimophila ruficauda ruficauda (Bonaparte)

RANGE: El Salvador to Costa Rica.

The Russet-tailed Sparrow is confined to the Pacific northwest from sea level to the upper tropical belt, perhaps locally a bit higher, along the deforested slopes of the Guanacaste Cordillera. Essentially a Tropical Dry Forest bird of the bushy and thickety, grassy and brushy semi-open, it frequents edges of scrubby growth, shrubbery, and overgrown ravines. This environment it shares, for example, with the native bobwhite (*Colinus leucopogon*). Usually it stays low, regularly dropping to the ground; sometimes it rises a little higher in trees. Almost always it occurs in bands the members of which move about in a more or less delayed follow-the-leader manner. If come upon unexpectedly when afoot, the birds often flush en masse to low twiggy branches the way bobwhite quails sometimes do. This large, solidly round-bodied sparrow always flies low, either hedge-hopping and tail-twisting or steadily fluttering, as though strained and uncomfortable, with the long axis of the body usually tilted slightly upward and the striped head and long slender spiky tail weakly drooping.

The bird uses its voice freely but is a poor singer. Its song is either a series of weak squeaky twitters that at best fall into an irregular pattern of "spink" 's or an involved jumble of rushing swirling "twisses." Also given are a "squeaky hinge" call mixed with kissing sounds, a sort of mechanical scraping cry, squeaky "tsip" 's or "chit" 's alone or in repetition like those of a hummingbird or a warbler, and other notes.

The three Costa Rican species of *Aimophila* are all at their southern limit in north-western Costa Rica as members of the Central American, or southern (or tropical) North American, arid Pacific avifauna. They are similar to one another in their sparrow-

streaked backs and in inhabiting open or semi-open grassy situations, but in general appearance they differ conspicuously. They are largely sedentary, semiterrestrial birds that fly little. Only *ruficauda* is widely distributed and met regularly, the other two being uncommon or rare and restricted to isolated strips along the cordilleran edges of the range of *ruficauda*. *Ruficauda* is hardly ever seen with either of the others, both of which prefer more open country. Only *ruficauda* occurs in sizable bands which, moreover, exhibit flock (or covey) behavior.

Aimophila rufescens (Swainson)

RUSTY SPARROW

RANGE: Northern Mexico to Costa Rica.

Aimophila rufescens hypaethrus Bangs

RANGE: Costa Rica.

The isolated Costa Rican population of Rusty Sparrow is virtually confined to a narrow belt that follows the Pacific side of the Guanacaste Cordillera, where it is known only from Cerro Santa María and Miravalles and Tenorio volcanoes. An extraordinary record from the southern edge of the central plateau (La Legua de Aserri) has never been repeated. Primarily a bird of open situations, it inhabits the characteristically boulder-strewn volcanic slopes and grassy fields and pastures dotted and patched with wiry bushes, undersized trees, and thickety scrub; it is as likely to be present in burned-over tracts as not. Where it does occur it is by no means uncommon, being seen in two's and in small groups perhaps more often than alone. Typical neighbors include the sparrow *Ammodramus savannarum*, the yellowthroat *Geothlypis poliocephala*, the bobwhite *Colinus leucopogon*, and the meadowlark *Sturnella magna*. The Rock Wren (*Salpinctes obsoletus*) may be present only in part, the congeneric *ruficauda* and *botterii* not at all or along the very periphery of its range.

The habits of this brightly plumaged *Aimophila* conform predictably to its surroundings. It hops on rocks and on the ground, where it is usually concealed by the grass. It clings to grass stems or stands on the rocks or perches on twigs in bushes or on the branches of scrubby trees. The bird is not especially shy and can often be seen closely. If surprised in

the open, it may seek the protection of bushy thickets or drop from view behind a rock. It does not penetrate the thickets deeply, but remains quietly near the edge or enters just far enough to be screened from sight, yet its heavy-bodied movements are not hard to follow. It does not freeze to the ground behind a rock, but resumes its activity in the grass or mounts a boulder to look around. Flight is strictly of the hedgehopping, twisting, fluttering type and of short duration.

Its song is quick, decisive, and chirkingly strong. My several transcriptions are rather meaningless, but I offer two of the variations: "chip·chip·chip dzreek" and "chip chíptsee-yoo." The bird also makes a guttural, partly scratchy two-note cry and a finely broken, wrenlike set of "chur" 's. Two or more birds may join in a whirring outburst of repeated "tsirur" 's and in a guttural "twickering."

***Aimophila botterii* (Sclater)**

BOTTERI'S SPARROW

RANGE: Southwestern United States to Costa Rica.

Aimophila botterii vulcanica

Miller and Griscom

RANGE: Nicaragua and Costa Rica.

This dull-colored *Aimophila*, one of the rare birds of the country, is restricted to a few sharply circumscribed sites in the Pacific northwest. The first and apparently the only past record for Costa Rica is that of two birds collected in 1906, by Charles H. Lankester in the grassy fields at the base of Miravalles Volcano. Though I sought it there in vain, I did find it farther north at Rincón de la Vieja and Orosí volcanoes. At Rincón de la Vieja it was living among the smooth rust-colored volcanic boulders well up the bare southwestern slope facing Liberia, at Orosí among the rough black volcanic rocks on the western flat approach. I saw it in two's, uncommonly, at both places.

This sparrow is evidently specially adapted to the same sort of unattractive environment as the Rock Wren (*Salpinctes obsoletus*). It is essentially terrestrial, progressing in small leaps and a hopping shuffle. It is not shy about exposing itself on rocks, on which it hops and to which it clings, as does the Rock Wren, even in a high wind. Flight is fluttery,

usually of the jerkily hedgehopping type, but the bird may also flutter steadily and rapidly for a hundred yards or so. Its only other notable mannerism is the one of generally keeping its tail cocked, sometimes at a right angle. So pronounced is this tendency that a strong muscular exertion seems required to lower it. This applies to the bird standing on a rock, not when foraging on the ground. In life, incidentally, the rufous on the wings is hardly noticeable, and the yellow at the wing bend is a pale line along the edge, seldom visible.

Though I encountered the species in two's in May, presumably during the breeding season, I heard no "song." A poor vocalist, it uttered a guttural "zir-zir-zir-zir" almost indistinguishable from the sound made by the neighboring Rock Wren and Meadowlark, a burred "churtwit" much like the call note of the Rock Wren, a rather sharp, almost snipping "tsit," and a weak thin "sit" or "tsit."

***Junco vulcani* (Boucard)**

IRAZÚ JUNCO

RANGE: Costa Rica and western Panama.

The Irazú Junco lives on the very high mountains that rise above the limit of trees. It is known thus far only from Irazú and Turrialba volcanoes and the northern sector of the Talamanca Cordillera; probably it occurs disjunctly on high crests southward to Panama. Strictly an inhabitant of the montane belt, it is common only from a little below to well above timber line. It inhabits thickety scrubby openings and "paramo," frequenting the low tangles and bushes, sometimes rising 30 feet to the top of a tree to look around. It forages regularly on the ground, where it hops, intermixing walking steps or not, and also runs. It flies little for short distances in a sparrow-like series of loud flutters with no twisting. Usually it is seen singly, also in two's accompanying young birds, and is not especially shy. Its pink bill, golden eye, and pinkish legs are the adornments of this rather plain, sparrow-streaked junco.

Its song is weak and unmusical. Birds on the Cordillera Central, according to my notations, utter a somewhat involved set of about 10 notes followed by a variable, strongly undulant trill or warble. Those on the Talamanca Cordillera produce a rhythmical succession of several little outbursts. The bird

also makes a squeaky chirp, an almost whistled "stchip," high, thin, weak "ptst" 's and "tsink" 's, a sharp "tsrip·tsrip·tsrip," and a sibilant, short, soft twitter.

Zonotrichia capensis (Müller)

ANDEAN SPARROW

RANGE: Southern Mexico to Tierra del Fuego; Hispaniola.

Zonotrichia capensis costaricensis Allen

RANGE: Costa Rica and western Panama.

The Andean Sparrow is one of the most common birds on the central plateau and the cleared northern and southern slopes of the Cordillera Central. In smaller numbers it occurs, probably continuously, along the Talamanca Cordillera to Panama. I found it at two localities on the Cordillera de Tilarán, but it is not reported from the Guanacaste Cordillera. It ranges from the middle and upper portions of the subtropical belt, seldom lower, to above timber line. The species has not spread downward from the cooler parts of the country despite great extensions of suitable habitat at the lower elevations.

Occurring singly or in two's, many individuals may be scattered about in virtually all the open areas, including agricultural and pasture lands, coffee fincas, and the cities and towns within its range. The bird keeps low in bushes and small trees and stands on tussocks and fallen trunks. It forages on the ground, where it hops about, pecks for small seeds, and sometimes scratches industriously with both legs at once; it takes soft-bodied animal food regularly. Its sweetly whistled, lazy "tseeeyúr tsee·tsee" is very similar to that of its highland neighbor, the meadowlark *Sturnella magna*. It is quite variable, and the plaintive first phrase is often followed by a

higher-pitched trill, a canary-like warble, a rough trill, or a rattle. The call note is a "zeep," and the bird may give undistinguished "chip" 's or "tsip" 's singly or in irregular repetition as does a hummingbird.

Emberizoides herbicola (Vieillot)

WEDGE-TAILED SPARROW

RANGE: Costa Rica to Bolivia and north-eastern Argentina.

Emberizoides herbicola lucaris Bangs

RANGE: Southwestern Costa Rica.

The species is at its northern limit in southwestern Costa Rica, where it is known only from the Térraba region. Here it is evidently confined to the tropical-belt "savannas" that spread like embayments and run like rivers through the scrubby woodlands. It is very local even in this restricted range. In two's and in small parties, this streaked, relatively slender-billed sparrow occurs in tangled shrubbery, bushes, and grass, keeping low and out of sight. From time to time, however, it perches rather erectly, with head held high, on low bushes and grass stems. Habitually it flicks its short wings and flicks and twists its long and pointed, double-pronged tail. Instead of taking to its short fluttery flight, the disturbed bird simply slips into low cover.

Its song is an unmusical decelerating "ticking" rattle, patterned like that of the ground cuckoo *Morococcyx erythropygus*, for example, but drier and much faster. The bird may keep repeating a weak "tik," like the clipping of a barber's scissors, similar to that of its neighbor, the grassquit *Volatinia*, but more rapid; that of the latter has a spread of from one to several seconds between successive notes. It also makes a warbler-like "stchip" and a swallow-like, soft "tschrip."

APPENDIX

KEY TO LOCALITIES ON LIFE-ZONE MAP

Names in italics are those of rivers or other bodies of water.

Abangares, D6
 Achiote, G6; inset O15
 Agua Caliente, H7; inset R18
 Ajuntaderas, I11
 Alajuela, G6; inset P16
 Alajuelita, H7; inset Q17
 Angostura, inset T17
 Aquiares, I7; inset T17
 Aranjuez, E6
 Arenal, E4
 Arenilla, inset R18
 Aserrí, H7; inset Q18
 Atalanta, K8
 Atenas, F7; inset N16
 Atirro, inset T18
 Azahar, inset R18

 Bagaces, C4
Bahía del Rincón, J12
Bahía de Limón, L6
Bahía de Salinas, B2
Bahía Piedra de Blanca (Carrillo), C7
 Bajos del Toro, G5
 Bajura de Guachipelín, D4
 Ballena, C5
 Balsa, F5
 Balsa, G7; inset N17
 Barba, H6; inset P16
Barmouth, K6
 Barra del Colorado, I3
 Barranca, E7
 Barranca, G6; inset N15
 Batán, J6
 Bebedero, D5
 Bella Vista, inset R18
 Birris, inset S17
Boca Barranca, E7
Boca Barú, H9
Boca Colorado, I3
Boca Coronado, I10
Boca Hatillo Nuevo, H9
Boca Mala, I10
Boca Matina, K6
Boca Motn, K6
Boca Palo Seco, G9
Boca Parismina, J5
Boca Parrita, G8
Boca Pirris, G8
Boca Portalón, H9
Boca Tárcoles, F7
Boca Zacate, I11

Bolsón, C5
 Bonilla, E7
 Bonilla, I6
Bonilla Lakes, I6
 Boruca, J10
 Buenavista, F5
 Buenos Aires, J10
 Bugaba, M13
 Burica, L13-L14

 Cabagra, K10
 Cabezas de la Caldera, E7
 Cabo Blanco, D8
 Cabo Velas, A5
 Cachí, I7; inset S18
 Cahuita, L7
 Cairo, J6
 Candelaria, inset N16
 Cañas Gordas, L12
Caño Negro, E3
 Capellades, I7; inset S17
 Caracol, J10
 Cariblanco, G5
 Carrillo, H6
 Carrillos, inset O16
 Carrizal, G6; inset P16
 Cartago, H7; inset R18
 Cascajal, F7
 Cascajal, inset R16
 Cataratas, F5
 Cerro Biolley, L10
 Cerro Brunka, J9
 Cerro Buena Vista, I8
 Cerro Candelaria, inset O17
 Cerro Cedral, G7; inset P17
 Cerro Chirripó, J9
 Cerro de la Muerte, I8
 Cerro Gorgona, C3
 Cerro La Carpintera, inset R17
 Cerro La Cruz, inset Q16
 Cerro La Cruz (de Candelaria), G7; inset P17
 Cerro Las Vueltas, H8
 Cerro Pittier, L10
 Cerro Rabo de Mico, G7; inset P17
 Cerro Redondo, inset Q16
 Cerro Róvalo, M10
 Cerro Santa María, C3
 Cerro Turrubares, F7
 Cerros de Aguacate, F6-F7; inset N16
 Cerros de Candelaria, inset N17-O17
 Cerros de Cedral, inset P17-P18
 Cerros de Escazú, inset P17-P18
 Cerros de Puriscal, inset N17-O17
 Cerros de San Juan, B5-B6

Cerros Tres Marías, inset R16
 Cervantes, I7; inset S17
 Changuinola, M9
 Chase, L8
 Chicua, inset S17
 Chilamate, H5
 Chirripó, J7
 Chomes, E6
 Cimarrones, J6
 Ciruelas, C4
 Ciruelas, inset O16
 Ciruelitas, E6
 Cocles, M8
 Coliblanco, inset S17
 Colonia El Salvador, H5
 Comadre, L7
 Comandancia de San Carlos, F4
 Comandancia de Sarapiquí, H4
 Concepción de Sto. Domingo, inset N17
 Coralillo, C5
 Coralillo, inset Q18
 Coronado, I10
 Coronel, H6
 Corredor, L12
 Cot, H7; inset S17
 Coto, K12
 Coyolar, C5
 Coyolar, F7
 Coyolito, B5
 Cuabre, L8
 Curridabat, inset Q17

Daytonia Farm, M8
 Desamparados, H7; inset Q17
 Desengaño Pass, inset P15
 Desmonte, F7; inset N17
 Divalá, M13
 Dos Novillos, I6

El Banco, E2
 El Castillo, F2
 El Cedral, inset P18
 El Coco, B4
 El Copey, H8
 El General, I9
 El Hogar, I6
 El Pozo del Río Grande, J11
 El Roble, E7
 El Roble, inset P16
 El Roble, G7; inset O16
 El Roble, I6
 El Tablazo, inset Q18
 El Tigre, J12
 Electrona, inset P17
 Escazú, G7; inset P17
 Esparta, F7
 Esquinas, K11
Estero Motn, K6

Estrella, L7
 Estrella de Cartago, inset R18

Filadelfia, B5
 Finca Alto Torito, inset T16
 Finca La Selva, H5
 Finca Los Cedros, G5
 Finca Robert, H7; inset S17
 Florencia, inset T17
 Fuentes, inset Q17

Golfito, K12
 Goshen, J6
 Grecia, G6; inset O16
 Greytown, I3
 Guácimo, I6
 Guadalupe, H7; inset Q17
 Guitil, G7; inset P18
 Guápiles, I6
 Guayabal, inset Q17
 Guayabillos Farm, inset R17

Hacienda Alemania, C2
 Hacienda Cabeza de Vaca, inset S17
 Hacienda Cañada, inset S17
 Hacienda Cañada, inset T18
 Hacienda Catalina, C5
 Hacienda El Pelón de la Altura, B3
 Hacienda El Pelón de la Bajura, C5
 Hacienda El Sauce, I6
 Hacienda Giralda, inset P15
 Hacienda Guachipelín, C3
 Hacienda Guayabo, D3
 Hacienda Guayabo, I6
 Hacienda Iberia, I6
 Hacienda La Granja, E4
 Hacienda La Palma, D5
 Hacienda Las Mellizas, L11
 Hacienda Los Angeles, C3
 Hacienda Miravalles, D4
 Hacienda Orosí, B3
 Hacienda Palo Verde, C5
 Hacienda Santa María, C3
 Hacienda Tenorio, D4
 Hacienda Tres Amigos, G4
 Hacienda Volcán, inset T16
 Hamburg Farm, J5
 Helechales, K10
 Heredia, H6; inset P16
 Herradura, F8
 Hervidero, inset R18
 Hoja Ancha, C6

Infiernillo, inset T17
 Inter-American Institute, inset T17
 Irazú, inset S17
 Isla Blanca, D8
 Isla Bonita, G6

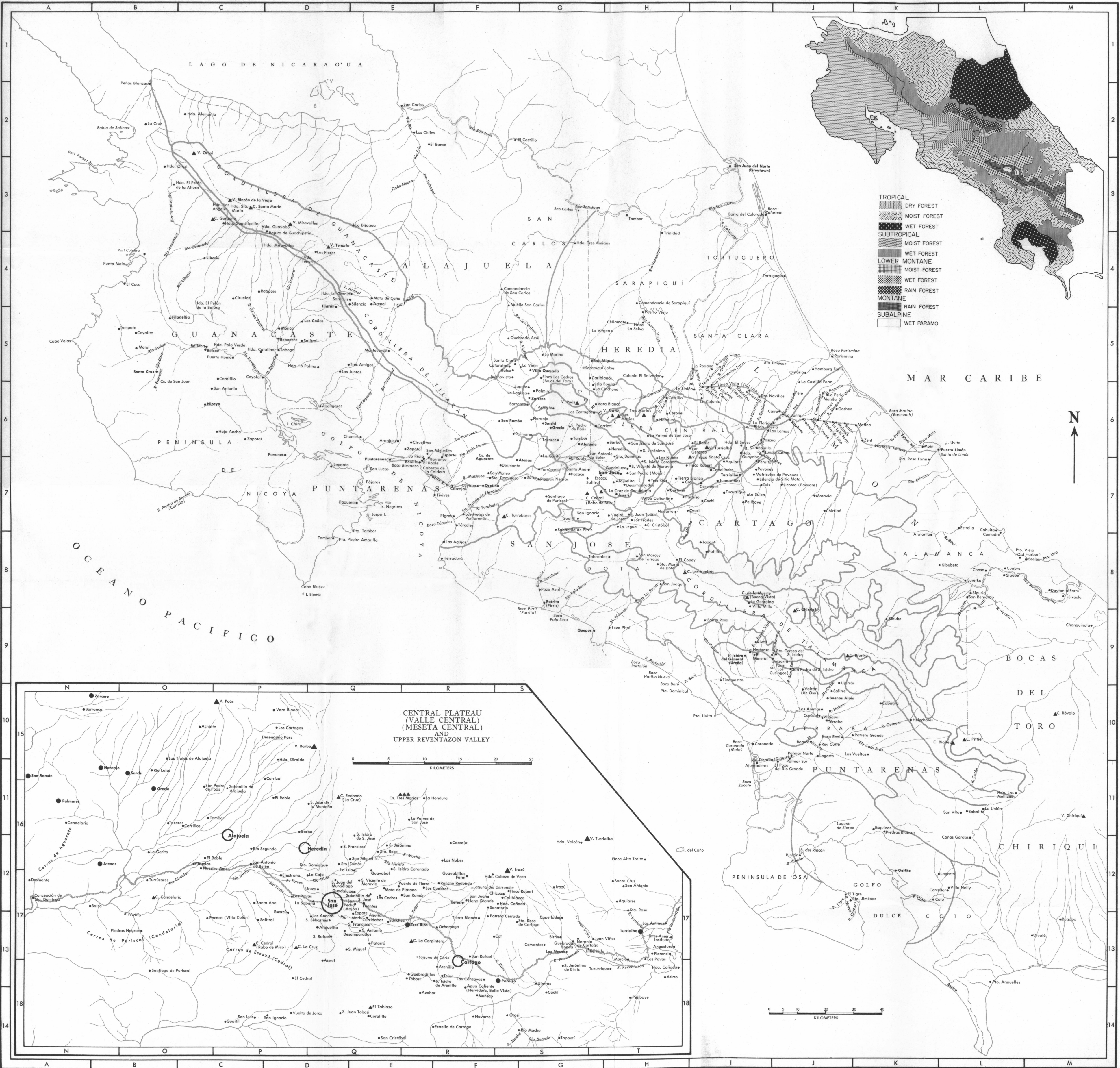


FIG. 1. Life-zone or plant-formation map (provisional), slightly modified from Holdridge (1959). For Key to Localities, see Appendix.

Isla Chira, D6
 Isla del Caño, H12
 Isla Pájaros, E7
 Isla San Lucas, E7
 Isla Uvita, L6
 Islas Negritos, E7

 Jasper Island, E7
 Jicotea, J7
 Jiménez, I6
 Juan Viñas, I7; inset T17

 La Bijagua, E3
 La Caja, inset Q17
 La Castilla Farm, J5
 La Cinchona, G6
 La Colonia, I6
 La Cruz, B2
 La Florida, J6
 La Garita, G6; inset O16
 La Georgina, I8
 La Hermosa, I9
 La Honduras, H6; inset R16
 La Isla, inset Q17
 La Junta, J6
 La Laguna, G6
 La Legua, H7
 La Lola Farm, J6
 La Marina, G5
 La Palma de San José, H6; inset R16
 La Perla, J6
 La Rioja, E7
 La Sabana, inset Q17
 La Suiza, I7
 La Unión, I6
 La Unión, L11
 La Vieja, G5
 La Virgen, H5
 Lagarto, J10
 Lagarto, K12
Laguna de Arenal, D4-E4
Laguna de Coris, inset R17
Laguna de Sierpe, J11
Laguna del Derrumbe, insert R17
 Las Agujas, F8
 Las Animas, J10
 Las Animas, inset T17
 Las Cañas, D5
 Las Cóncavas, inset S18
 Las Flores, D4
 Las Juntas, D5
 Las Lomas, I6
 Las Mesas, inset S17
 Las Nubes, H6; inset R16
 Las Pavas, inset P17
 Las Pavas, inset T17
 Las Trojas de Alajuela, inset O15
 Las Trojas de Puntarenas, F7

Las Vueltas, K10
 Lepanto, D7
 Liberia, C4
 Linea Vieja, I6-J6-K6
 Llano Grande, inset R17
 Los Anonos, inset Q17
 Los Cartagos, G6; inset P15
 Los Cedros, inset Q17
 Los Chiles, E2
 Los Cuadros, inset R17
 Los Cusingos, J9
 Los Diamantes Farm, I6
 Los Frailes, H7

 Madre de Dios, J6
 Manila, J6
 Mata de Caña, E4
 Mata de Plátano, inset Q17
 Matina, K6
 Matriculas de Pavones, I7
 Moín, K6
 Mojal, B5
 Mojica, D5
 Mojón, H7; inset Q17
 Monte Verde, J6
 Monteverde, E5
 Moravia, J7
 Muelle San Carlos, F4
 Muñeco, inset R18
 Murcia, inset T18

 Naranjo, G6; inset N15
 Naranjo de Cartago, inset S17
 Navarro, H7; inset R18
 Nicoya, C6
 Northern Railway, H7-I7-I6-J6-K6
 Nuestro Amo, inset O17

 Ochomogo, inset R17
 Old Harbor, L8
 Old Line Railroad, I6-J6-K6
 Ontario, J5
 Orosi, H7; inset S18
 Orotina, F7

 Pacaca, G7; inset O17
 Pacific Railroad, E7-F7-G7-H7
 Pacuare, J7
 Pacuarito, J6
 Palmar Norte, J10
 Palmar Sur, J10
 Palmares, F6; inset N16
 Palmira, G6
 Paquera, E7
 Paraíso, H7; inset S18
 Parismina, I6
 Parismina, J5
 Parrita, G8

- Pascua, I6
Paso Real, J10
Patarrá, inset Q17
Patillas, I8
Pavones, D6
Pavones, I7
Peje, J6
Pejibaye, I7; inset T18
Peñas Blancas, B2
Peralta, I7
Piedras Blancas, K11
Piedras Negras, G7; inset O17
Pigres, F7
Pirris, G8
Port Culebra, B4
Port Parker Bay, A3
Potrero Cerrado, inset R17
Potrero Grande, J10
Pozo Azul, G8
Pozo Pital, H9
Puente de Tierra, inset Q17
Puerto Armuelles, L13
Puerto Humo, C5
Puerto Jiménez, J12
Puerto Limón, K6
Puerto Viejo, H5
Puerto Viejo, L8
Punta Dominical, I10
Punta Mala, B4
Punta Piedra Amarilla, D8
Punta Tambor, E7
Punta Uva, M8
Punta Uvita, I10
Puntarenas, E7
- Quebrada Azul, F5
Quebrada Honda, inset S17
Quebradillas, inset R18
Quepos, G9
Quizarrá Farm, J9
- Rancho Redondo, inset R17
Retes, inset R17
Rey Curré, J10
Rincón, J12
Río Luisa, inset O15
Río Macho, inset S18
Río Segundo, inset P16
Río Arenal, E4-F5
Río Banano, K7
Río Barranca, E7-E6-F6
Río Barú, H9-I9
Río Bebedero, D5
Río Bité, L8
Río Blanco, I5-I6
Río Bonilla, I6
Río Boruca, J10
Río Buena Vista, I9
- Río Cañas*, B5-C5
Río Ceibo, J9-J10
Río Cimarrones, J6
Río Ciruelas, inset O17-P16
Río Colorado, C3-C4-B4
Río Colorado, I3-I4
Río Corozal, K12-K13
Río Coto, K12-L12
Río Coto Brus, J10-K10-K11-L11
Río Cotón, L11
Río Cristina, I5
Río de las Piedras, C4-C5-D5
Río de los Reyes, H8
Río Destierro, I6-J6
Río Diquis, I10-J10
Río Drita, B5
Río Dos Novillos, I6
Río Enmedio, B5
Río Frío, E2-E3
Río General, I4-I5-H5-H6
Río Grande, inset S18
Río Grande de Tárcoles, F7-F8
Río Guacimal, E5-E6
Río Guineal, K10
Río Hakum, J10
Río Honduras, H6
Río Jesús María, F6-F7
Río Jiménez, J5-I5-I6
Río Juan Viñas, inset S17-T17
Río Lagarto, E5-E6
Río Liberia, C4-C5
Río Macho, I7-H8; inset S18
Río Macho, inset Q16-R16
Río Machuca, F7
Río Madre de Dios, J6
Río María Aguilar, inset Q17-R17
Río Naranjo, H8-H9
Río Nuevo, J12
Río Pacuar, I9
Río Pacuare, J5-J6
Río Pérez, inset S17-S18
Río Palo Seco, G8-G9
Río Peñas Blancas, J9
Río Pirris, G7-G8
Río Platanar, F5-G5
Río Portalón, H9
Río Puerto Viejo, H5-H6
Río Reventazón, J5-J6-I6-I7; inset S18-T18-T17
Río Rincón, J12
Río Sabogal, E3-F3
Río San Juan, E2-F2-G2-G3-H3-I3
Río San Pedro, J9
Río San Rafael, F4-F5-G5
Río Santa Clara, I5
Río Sarapiquí, H4-H5-G5-G6
Río Sixaola, L8-M8
Río Suab, L8
Río Sucio, H4-H5-H6

Rto Sucio, H6
Rto Surubres, G8
Rto Tarire, L8-M8
Rto Tempisque, B4-B5-C5
Rto Tempisque, B3
Rto Tenorio, D4-D5
Rto Terraba, I10-J10
Rto Tibás, inset P17-Q17-Q16
Rto Tigre, J12
Rto Tiribí, inset P17-Q17-R17
Rto Toro, K6
Rto Toro Amarillo, I5-I6
Rto Torres, inset P17-Q17
Rto Turrialba, inset T17
Rto Turubales, F7
Rto Urén, L8-L9
Rto Virilla, inset O17-P17-Q17-Q16-R16
Rto Yorkín, L8-L9
Rivas, I9
Roxana, I5

Sabalito, L11
Sabanilla de Alajuela, inset P16
Sabanilla de Pirris, G7
Sabanilla de San José, inset Q17
Salitral, D5
Salitral (de San José), G7; inset P17
Salitre, J10
San Antonio, C6
San Antonio, inset Q17
San Antonio, inset T17
San Antonio de Belén, G6; inset P16
San Bernardo, L8
San Carlos, E2
San Carlos, G3
San Cristóbal, H7; inset Q18
San Francisco, inset Q16
San Francisco, inset Q17
San Gerardo, I6
San Ignacio, G7; inset P18
San Isidro Coronado, H7; inset Q17
San Isidro de Arenilla, inset R18
San Isidro del General, I9
San Isidro de San José, H6; inset Q16
San Jerónimo, H6; inset Q16
San Jerónimo de Birris, inset S18
San Joaquín, H8
San José, H7; inset Q17
San José de la Montaña, inset Q16
San Juan, inset R17
San Juan del Murciélagos, inset Q17
San Juan del Norte, I3
San Juan Tobosi, H7; inset Q18
San Luis, E4
San Luis, inset P18
San Marcos de Tarrazú, H8
San Mateo, F7
San Miguel, G5

San Miguel, inset Q17
San Miguel Norte, inset Q16
San Miguelito, E6
San Pedro, H7; inset Q17
San Pedro de Poás, G6; inset O16
San Pedro de San Isidro, J9
San Rafael, inset Q17
San Rafael, inset R17
San Ramón, F6; inset N15
San Ramón, inset R17
San Sebastián, inset Q17
San Vicente de Moravia, H7; inset Q17
San Vito, L11
Sanatorio, inset R17
Sánchez, inset Q17
Santa Ana, G7; inset P17
Santa Clara, F5
Santa Clara, I6
Santa Cruz, B5
Santa Cruz, I6; inset T17
Santa María de Dota, H8
Santa Rosa, I9
Santa Rosa, inset Q16
Santa Rosa, inset T17
Santa Rosa de Cartago, inset S17
Santa Rosa Farm, K7
Santa Teresa de San Isidro, J9
Santiago de Puriscal, G7; inset O18
Santo Domingo, F7
Santo Domingo, H6; inset Q16
Santo Tomás, inset Q16
Sarapiquí Lakes, G5
Sarchí, G6; inset O15
Sibube, K9
Sibube, L8
Sibubeta, L8
Silencio, E4
Silencio de Sitio Mata, I7
Sipurio, L8
Siquirres, J6
Sixaola, M8
Suretka, L8

Tabacales, H8
Taboga, D5
Tacares, G6; inset O16
Tambor, D8
Tambor, H3
Tambor, G6; inset O16
Tapantí, I8; inset S18
Tárcoles, F7
Tejar, inset R18
Tempate, B5
Terraba, J10
Tierra Blanca, H7; inset R17
Tilarán, D4
Tinamastas, I9
Tivives, F7

Tobosi, inset R18
 Toro Amarillo, I6
 Tortuguero, J4
 Tres Amigos, D5
 Tres Marías, H6
 Tres Marías, H6
 Tres Ríos, H7; inset R17
 Trinidad, H4
 Tucurrique, I7; inset T18
 Tuis, I7
 Tunnel Camp, I6
 Turrialba, I7; inset T17
 Turrúcares, G7; inset O17

Ujarrás, J9
 Ujarrás, inset S18
 Ureña, I9
 Uruca, inset Q17

Vara Blanca, G6; inset P15
 Vijagual, J10
 Villa Colón, inset O17
 Villa Mills, I8

Villa Nelly, L12
 Villa Quesada, G5
 Volcán Barba, H6; inset Q15
 Volcán Chiriquí, M11
 Volcán Irazú, I6–I7; inset S17
 Volcán Miravalles, D3
 Volcán Orosí, C2
 Volcán Poás, G6; inset P15
 Volcán Rincón de la Vieja, C3
 Volcán Tenorio, D4
 Volcán Turrialba, I6; inset T16
 Volcán (de Osa), J10
 Vuelta de Jorco, H7; inset P18

Waldeck, J6

Zapotal, C6
 Zapotal, E6
 Zapote, G6
 Zapote, inset Q17
 Zarcero, G6; inset N15
 Zent, K6

COMMENTS ON LOCALITIES FOR THE LIFE-ZONE MAP

I have attempted to plot on the life-zone map every site at which birds have been collected or observed. The best single source is Carriker's gazetteer (1910, pp. 332–357). Since 1910, other workers have added to the number, while Carriker apparently overlooked several. The following list includes names of places that I have not been able to find or to locate precisely, as well as a few of the mapped localities for which explanatory comment is necessary.

AJO NARANJA, CANDELARIA: Perhaps a variant of Hoja Naranja or Ojo Naranjo, none of which I have been able to locate. The site lies somewhere in the mountains south of San José, at an altitude of some 5500 feet.

ALTO DE JABILLO (PIRRÍS): Not located. "A locality above the hamlet of Jabillo de Pirrís, situated between San Gerónimo and Pozo Azul on the main road to Pirrís, altitude about 3000 feet" (Goodwin, 1946, p. 454).

ARENALES DE CARTAGO: Not located. Probably the same as Arenilla (near Cartago).

BAHÍA DE SALINAS: Although he located it correctly on the Pacific coast at the Costa Rica-Nicaragua border on his map, Carriker (1910, p. 334) placed it "just at the entrance to the Gulf of Nicoya" in the text.

BARRANCA (BORUCA; TÉRRABA): Not located. Undoubtedly confused with Barranca de Pun-tarenas.

BITEÍ: Not located. Somewhere at the Río Biteí, a tributary of the Río Estrella in the "Talamanca" sector.

BONNECOURT: The name of a person, not a locality.

BRUNKA: Not located. There is a Cerro Brunka, shown on the map, near Cerro Dúrika in the upper Térraba region.

BURGOS DE IRAZÚ: Not located. An old finca on the southwestern slope of Irazú Volcano.

CAMP CALAMITY (RÍO MATINA): Not located.

CANDELARIA: Refers to the town, the peak, or the mountains south and west of San José.

CANGREJAS: Not located. Probably a streamlet flowing into the Río Torres on the north side of San José. There is also a Cerro Cangreja south of Cartago.

CAÑO SECO: Not indicated. A small stream flowing into the Río Siquirres.

COLA DE MICA: Probably synonymous with Rabo de Mico, a peak south of Escazú.

CONCEPCIÓN: Any of a number of localities bearing this name.

CONCEPCIÓN DE JIMÉNEZ: Not located. Probably near Jiménez at the northern base of Turrialba Volcano.

CONCEPCIÓN DE SANTO DOMINGO: Indicated:

near San Mateo on the Pacific approach to the central plateau. Not indicated: two other localities northeast of Heredia.

CORALILLO: Several places have this name. I have indicated one in Guanacaste and another south of San José as the most likely bird-collecting sites.

CRATER HOTEL (ALTOS DE POÁS): Not located. Somewhere high on Poás Volcano.

DOTA: Refers indefinitely to the Dota region.

EL ALTO (DE OCHOMOGO): The point at which the highway and railroad cross the continental divide between Tres Ríos and Cartago.

EL BERILLA: Not located. Probably misspelled.

EL HONDONADO: Not located. Definitely not a variant of La Hondura. Probably not a Costa Rican locality, but one at which Underwood may have collected in Honduras or Guatemala.

EL POZO DEL RÍO GRANDE, BORUCA: Not located. Perhaps the same as El Pozo del Río Grande in the lower Térraba Valley.

EL POZO DE TÉRRABA: Same as El Pozo del Río Grande.

EL REY DE DOTA: Not located. Possibly refers to Cerro El Rey in the Cerros de Bustamente forming part of the Dota region.

ESPERANZA: Not located. This particular Esperanza is, or was, in the vicinity of Pacuarito near Siquirres.

ESTRELLA DE MOJÓN: Not located.

FINCA ORTUNIO (DESAMPARADOS): Not located. Vicinity of Desamparados, near San José.

GARZA, LIMÓN: Not located. There is a Garza on the Pacific shore of the Nicoya Peninsula.

GMOKUL: Not located. Somewhere in the southeastern lowlands near the outflow of the Río Urén.

GUAYABAL: At least two places have this name. I have indicated one on the central plateau, near San Isidro de Coronado. I cannot find the other, "a small village not far from Turrialba on the Caribbean slope at an altitude of about 2,000 feet" (Carriker, 1910, p. 343).

HDA, ORIETTA (PERALTA, 3500 ft.): Not located.

LA CRISTINA: Not located. Probably at the Río Cristina near the Old Line Railroad.

LAGARTO: I have indicated two such localities in the southwest. *Oenoenas subvinacea*, a highland species, has been collected at probably a different Lagarto, which I cannot find.

LAGUARIA (LAGUNARIA) DE DOTA: Not located. "A point high up in the Dota Mountains . . . south of Santa María and El Copey, and probably nearly 10,000 feet above the sea" (Carriker, 1910, p. 345). However, *Ramphocaenus melanurus*, not known otherwise above the subtropical belt, has been recorded from there.

LAGUNA CHIQUITA: Not indicated. One of the Bonilla Lakes.

LAGUNA DE CARTAGO: Not indicated. At Ochomogo on the continental divide between Tres Ríos and Cartago.

LAGUNA DE OCHOMOGO: Same as Laguna de Cartago.

LAGUNA EL ALTO: Same as Laguna de Cartago.

LAGUNA GRANDE: Not indicated. One of the Bonilla Lakes.

LAGUNA TAPADA DE BIRRÍS: Not located.

LAS AGUJAS (DE IRAZÚ): Not located. Above Las Rosas (not located) on Irazú Volcano.

LAS AJUNTAS DE TÉRRABA: Probably the same as Ajuntaderas at the mouth of the Río Térraba.

LAS HONDONADAS: See El Hondonado.

LAS TEMBLADERAS (IRAZÚ): Not located. Probably high on Irazú Volcano.

LAS VUELTAS, CAÑAS GORDAS: Not located. There is a Las Vueltas beside the lower Coto Brus Valley, altitude about 2000 feet.

LOS REYES (STA. MARÍA DE DOTA): Not located. Possibly refers to Río de los Reyes. Also see El Rey de Dota.

LOS TEMBLORES: See Las Tembladeras.

MACHUCA: Not located. Perhaps at the Río Machuca in the Aguacate Mountains.

MIRAVALLS: "The term 'Miravalles' as applied by collectors usually refers to the large cattle-ranch on the slopes of the volcano, rather than to the mountain itself" (Carriker, 1910, p. 346).

MONTE REDONDO: Not located. According to Carriker (1910, p. 346): "A point in the Candelaria Mountains, situated over the crest, south of San José, in a valley at an altitude of about 4,000 feet. Many of Underwood's labels bearing the locality name of Candelaria, refer to this point."

NAVARRITO: Not located. Near Navarro, southeast of Cartago.

NICOYA: As generally used, refers to the Nicoya Peninsula rather than to the town of Nicoya.

OJO ANCHO: Same as Hoja Ancha (Hojancha) in the Nicoya Peninsula.

OROSI; OROSÍ: Orosi is a town in the upper Reventazón Valley. Orosí is the name of a volcano and its vicinity in northern Guanacaste. The two have been used interchangeably on labels.

PANDORA: Not indicated. South of Puerto Limón, in the Estrella Valley about halfway between Atalanta and the coast.

PANTANOS DE SIERPE: Not indicated. Swamps at the far southwestern Caño de Sierpe. Not to be confused with the swampy mouth of the Río Sierpe near Tortuguero in the northeast.

PEORSNADA: Not located. Undoubtedly a garbled transcription.

PICADO DE TÉRRABA [= PUCADO DE TÉRRABA]:

Not located. "A small town near Terraba" (Goodwin, 1946, p. 456).

PICO BLANCO [= CERRO KÁMUK]: Not indicated. Source of the Río Urén, a tributary of the Río Sixaola.

PIEDRA DE BLANCA, GUANACASTE: Not located. Probably at the Bahía Piedra de Blanca [= Bahía Carrillo] on the Pacific coast of the Nicoya Peninsula.

PIRRÍS: Sometimes refers not to Pirrís on the Pacific coast southwest of San José, but to Birrís in the upper Reventazón Valley.

POTRERO FELIPE DÍAZ (IRAZÚ RANGE): Not located.

PUNTA PIEDRA, GUANACASTE: Not located. Somewhere on the Pacific shore of the Nicoya Peninsula, possibly at Bahía Piedra de Blanca.

QUEBRADA DE MORAVIA: Not indicated. The subtropical course of the Río Moravia in Cartago Province.

QUIZARRÁ FARM: Not indicated. At 2000 meters elevation on the north slope of Irazú Volcano. Not to be confused with Quizarrá Farm in the General sector of the southwest.

RANCHO DE RÍO JIMÉNEZ: Not located. "On the Río Jiménez, northern slope of Volcán Turrialba, altitude 3600 feet" (Goodwin, 1946, p. 456).

RANCHO GRANDE: Not located. Perhaps the same as Llano Grande on the southwestern slope of Irazú Volcano.

REVENTAZÓN: Refers indefinitely to the Reventazón Valley. I can find no town with this name.

REYTES: Probably a variant of Retes on Irazú Volcano.

RINCÓN DE CUBILLOS, SAN JOSÉ: Not located.

RÍO ASERRÍ: Not indicated. Undoubtedly the stream at which the town of Aserrí is situated.

RÍO COLORADO: I have indicated several rivers with this name. Not indicated is a Río Colorado, which I have visited, that originates on the slopes of the Talamanca Cordillera and empties into the Río Coto Brus in the far southwest; it is not shown on any map.

RÍO DAGUA: Not located.

RÍO FRÍO: Not the Río Frío that empties into Lake Nicaragua. Probably refers to the Río Agua Fría or a tributary on the north slope of Irazú Volcano.

RÍO GUAYABO: Not indicated. A small stream that empties into the Río Blanco, which empties into the Río La Ceiba, at the western foot of Miravalles Volcano. Not to be confused with the Río Guayabo on the southeastern slope of Turrialba Volcano.

RÍO PEJE: Five streams bear this name: a tributary of the Río Platanar that empties into the Río San Carlos; a tributary of the Río

Guacalito that empties into Lake Nicaragua; a tributary that enters the Río Reventazón at Peje in the northeast; a tributary of the Río Chirripó in the east-central Caribbean lowlands; a tributary of the Río Cañas that empties into the Río Térraba.

RÓVALO: Not in Costa Rica. A peak in Bocas del Toro Province, Panama, north of Chiriquí Volcano.

SABANA DE CARTAGO: Not located.

SABANA (SABANILLA) DE F. DÍAZ: See Potrero Felipe Díaz.

SALISTRAL: Not located. Perhaps a variant of Salitral, a name given to several different localities.

SALITRAL (IRAZÚ): Not located.

SALITRILLO: Not located. "There are two places of this name, one near Santa Ana de Escazú, the other near Desamparados" (Carriker, 1910, p. 351). It is also the name of a small stream near Mata de Plátano, northeast of San José.

SAN ANTONIO: I have indicated a few of the many San Antonio's.

SAN CARLOS: Refers indefinitely to the San Carlos region or to the town of San Carlos in northern Costa Rica. Not to be confused with San Carlos, Nicaragua, at the southeastern corner of Lake Nicaragua.

SAN EMILIO: Not indicated. Several sites bear this name.

SAN ISIDRO: I have indicated a few of the localities with this name.

SAN LUCAS DE DOTA: Not located. Probably in the Dota Mountains.

SAN MIGUEL: I have indicated a few of the localities with this name.

SAN PEDRO: I have indicated a few of the many localities with this name.

SAN RAFAEL: I have indicated two of the localities with this name.

SAN VICENTE DE ALAJUELA: Not located.

SANTA MARÍA DE HEREDIA: Not located.

SANTA ROSA: I have indicated several of the localities with this name.

SARAPIQUÍ: "The name as used by collectors refers to the region of Cariblanco de Sarapiquí" (Carriker, 1910, p. 353). There is also a locality at lower elevation shown as Sarapiquí on some maps, as Comandancia de Sarapiquí on other maps, or not at all on other maps.

SARAPIQUÍ LAKES: Indicated. Also known as Cariblanco Lakes and Echandi Lakes, consisting of Laguna del Hule and Laguna del Congo.

SUERRE: Not located. "A 'finca' near Jiménez, altitude about 1500 feet. Alfaro's collecting station. Suerre was also the old name for Llanos de Tortuguero, at the mouth of the Reventazón and principal port of entry for the early colonists" (Goodwin, 1946, p. 457).

SURUBRES: Not located. Probably a locality on the Río Surubres.

TABACALES: Indicated: an area 10 kilometers west of San Marcos de Tarrazú. Not located: the Tabacales mentioned by Frantzius (1869, p. 200) on the western slope of Irazú Volcano.

TALAMANCA: Refers indefinitely to the entire southeastern slope, southward from the Estrella Valley.

TARRAZÚ: "The name of a canton of the province of San José, lying in the Dota Mountains. The name as used on labels probably refers to the part known as Bajos de Tarrazú, near San Marcos, and at an altitude of about 4,000 feet" (Carriker, 1910, p. 354).

TENORIO: Refers indefinitely to the volcano, the cattle ranch at its base, and to the general vicinity.

TEPEYAT: Not located. In the subtropical belt on the northeastern approach to Cerro Chirripó.

TIRIBÍ: Not located. Probably a site at the Río Tiribí and in the vicinity of San José.

TOBOSI (DE CHIRRIPO): Not located. In the subtropical belt on the northeastern approach to Cerro Chirripó.

TROJAS DE SALINAS: Same as Trojas de Puntarenas.

VAL: Not located.

VALSA: Not located. Probably a variant of Balsa, of which there are two localities so named, both indicated.

VIJAGUA: Same as La Bijagua.

52-MILE STATION: Either the same as, or very close to, Bonilla on the Northern Railway.

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